SEPTEMBER 1959

PROCESS KNOWLEDGE THE KEY TO COMPUTER-CONTROL FUTURE

***A highlight of CP's Fifth Annual Feature on* PROCESS INSTRUMENTATION . page 84**

IN THIS ISSUE:

More than 275 concise reports on new processing techniques, materials, instruments, equipment . . . see page 6

CHEMICAL PROCESSING®

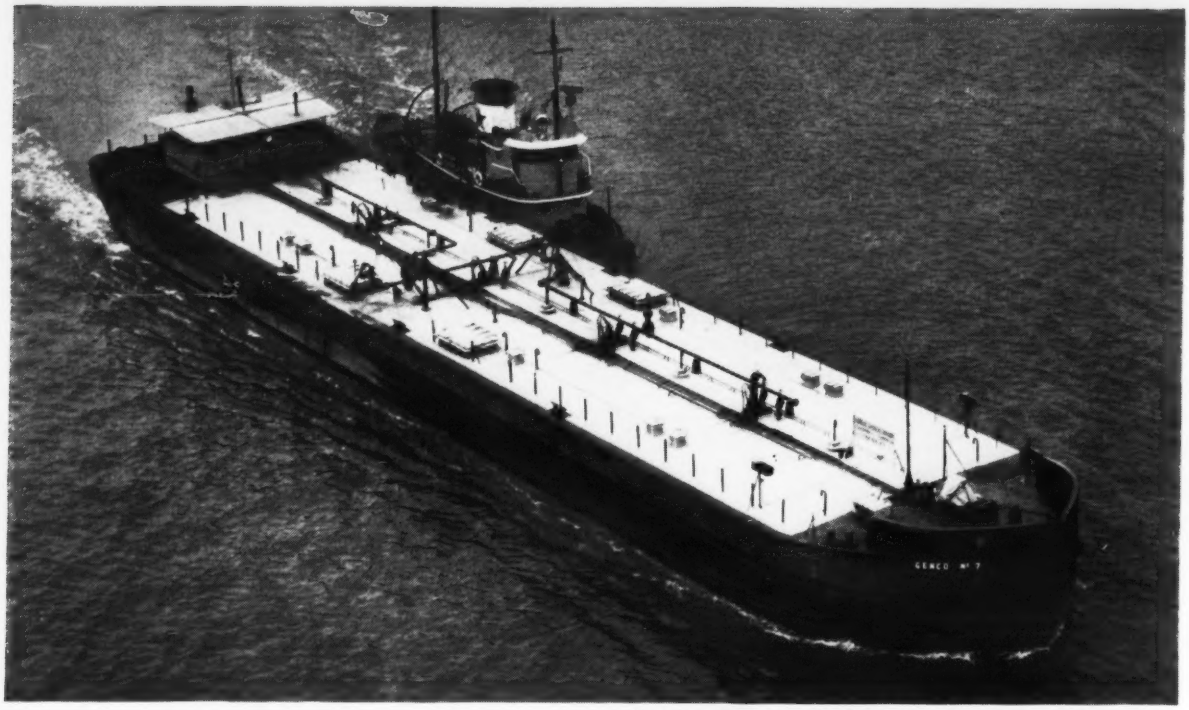
PLANNED GROWTH from WITHIN

. . . a case study of the reshaping of FMC's Chemical Divisions . . . page 27

CARL PRUTTON
'Reorganization Man' for FMC-CD

the copy

A PUTMAN PUBLICATION "Executive Magazines for Industry



Capacity—2000 tons of sulfuric! *The "Genco 7" is the largest in General Chemical's fleet of eight sulfuric acid barges.*

Call on **GENERAL CHEMICAL** for ***Sulfuric Acid*** ...*As you need it!* ...*When you need it!* ...*Where you need it!*

Whether your sulfuric acid requirements are measured in thousands of tons or carboy lots, General Chemical is best equipped to handle your order.

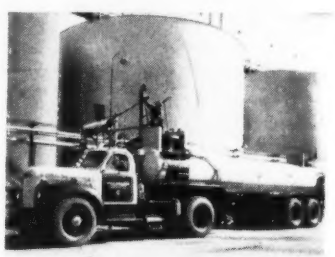
General's extensive network of production facilities plus its large and flexible transportation system assures you of sulfuric as you need it . . . when you need it . . . where you need it!

For example, we have eight sulfuric barges serving customers along the Atlantic coast and on inland waterways. Three operate out of Marcus Hook (Philadelphia), Pa. Two in the New York City area, including the 2000-ton capacity "Genco 7" shown above. Three on inland waterways. General also operates the largest fleets of sulfuric tank cars and tank trucks in the country.

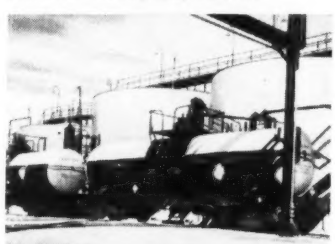
General Chemical has 21 sulfuric plants,* as well as stock points in key industrial centers across the country. Each is geared to meet regional requirements, offering customers the advantages of "next door" location to General's modern facilities. In addition, the output of one plant backs up that of another, making a coast-to-coast supply line which proves invaluable in meeting emergencies or unexpected demands.

Why not find out how our long experience and extensive facilities can benefit you? For further information, write or phone the nearest General Chemical sales office.

**In Canada: Allied Chemical Canada, Limited*



Large fleets of tank transports provide fast over-the-highway service.



By far the largest fleet of sulfuric tank cars is operated by General Chemical.

General Chemical sulfuric acid is also available in 13-gallon carboys.

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

Check 3697 opposite last page.

conventions and exhibits

September 10-11. 2nd International Air Pollution Congress, American Society of Mechanical Engineers, Statler Hilton Hotel, N.Y.C.

September 10-11. Society of Plastics Industry, Midwest Conference, French Lick, Indiana.

September 13-18. American Chemical Society, 136th National Meeting, Atlantic City.

September 17-20. Drug, Chemical and Allied Trades Section, New York Board of Trade, 69th Annual Meeting, Sagamore Hotel, Bolton Landing, Lake George, N.Y.

September 20-22. Chemical Market Research Association, Textile Fibers—Yesterday and Today, Williamsburg, Virginia.

September 21-23. 14th TAPPI Paper-Plastics Conference, Edgewater Beach Hotel, Chicago.

September 21-25. 14th Annual Instrument-Automation Conference and Exhibit, International Amphitheatre, Chicago.

September 22-24. Industrial Nuclear Technology Conference, Morrison Hotel, Chicago.

September 24-25. American Society for Quality Control, Chemical Division, Annual Conference, Shamrock Hilton Hotel, Houston, Texas.

September 28-29. Conference of Plant Operators on Safety in Air (cryogenic) and Ammonia Plants, in collaboration with American Institute of Chemical Engineers, Hotel St. Paul, St. Paul, Minnesota.

September 28-30. American Oil Chemists' Society, Hotel Statler, Los Angeles.

September 29-*October* 1. National Association of Corrosion Engineers, Western Regional Meeting, Bakersfield Inn, Bakersfield, California.

October 1-2. Society of the Plastics Industry, 15th New England Section Conference, Wentworth-by-the-Sea, Portsmouth, N.H.

...Meetings and shows of interest to the chemical industries

October 5-7. Packaging Specifications Conference, Purdue University, Lafayette, Indiana.

October 5-8. National Association of Corrosion Engineers, Northeast Region Conference, Lord Baltimore Hotel, Baltimore, Md.

October 6-9. International Symposium on High Temperature Technology, Stanford Research Institute, Asilomar, California.

October 13-14. Society of Plastics Engineers, Southern California Section, Ambassador Hotel, Los Angeles.

October 20-24. Federation of Paint and Varnish Production Clubs, 37th Annual Meeting and the 24th Paint Industries' Show, Convention Hall, Atlantic City.

October 22-24. Acoustical Society of America, Cavitation, Cleveland, Ohio.

November 2-5. 11th Exposition of the Air-Conditioning and Refrigeration Industry, Convention Hall, Atlantic City.

November 2-6. 41st National Metal Exposition & Congress, International Amphitheatre, Chicago.

November 5-6. Industrial Management Society, 23rd Annual National Industrial Engineering and Management Clinic, Conrad Hilton, Chicago.

November 16-20. Fifth International Automation Congress and Exposition, New York Trade Show Building, N.Y.C.

November 17-20. Packaging Machinery Manufacturers Institute Show of 1959 and Annual Forum, Coliseum and Statler Hotel, N.Y.C.

November 30-*December* 4. 1959 Exposition of Chemical Industry, Coliseum, N.Y.C.

December 6-10. American Institute of Chemical Engineers, Annual Meeting, Sheraton Palace Hotel, San Francisco.

Fred Godley, manager of Continental Manufacturing's sales engineering section explains...

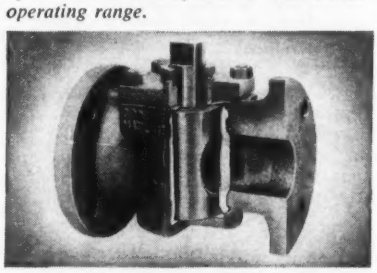
"Why Tufline self-lubricated valves are specified"

Many engineers are re-evaluating that old stand-by, the "shut-off" valve, and are finding out for themselves that some improvements have been made. The result is that every day more Tufline* plug valves are being specified for both new construction and replacement use.

Why? Because of their design, Tufline valves cannot stick or gall while still remaining bubble tight after years of service. This is made possible by the fact that Tufline's tapered plug is seated in a resilient sleeve of pure Teflon® locked in the body bore. In other words, the sealing is effected without any metal-to-metal contact, grease film, or flexing diaphragm.

Tufline's design "secret" is in the configuration of the inner body bore, with its integral sealing ribs and carefully proportioned relief areas coupled with the special tempering of the pure Teflon sleeve. This combination permits the sleeve to expand or contract with changes in temperature or pressure while still maintaining its resilience at the critical sealing areas.

Result: *Tufline valves seal without leakage through the line or to the outside even throughout repeated temperature cycling up to a maximum of 250° F within their operating range.*



TYPICAL USAGE

Standard Tufline valves are surprisingly versatile:

Corrosion Service . . . acetic, H_2SO_4, HNO_3, HF . . . Because valve seats are protected by chemically inert pure Teflon, Tufline valves have *unusually long life under the most severe corrosive conditions.* They are available in a wide choice of metals and alloys.

Hazardous Fluids . . . pyrofuoric exotic fuels, oxygen, fluorine . . . A non-flexing auxiliary diaphragm seal within the all-metal-enclosed body *affords double protection against leakage* to the outside. The four-bolted male-female body cover provides maximum safety.

Slurries . . . plastisols, paints, waste liquors . . . Uninterrupted flow, absence of in-line cavities and wiping action on the plug prevent build-up of solids and *assures operation of Tufline valves* where other conventional valves fail.

Light Gases and High Vacuum . . . helium, freon, hydrogen, 1/10 micron Hg vacuum . . . High density *pure* Teflon seal, high compression ribbed sealing plus double sealing against outside leakage *provides maximum tightness.*

Non-Contaminating Services . . . demineralized water, pharmaceuticals, food processing . . . Absence of all lubricants, ease of cleaning or disassembly, and straight through flow *prevent contamination of media being handled.*

Steam-Out Services . . . sterilization, flushing . . . The ability of Tufline valves to *maintain seal under temperature fluctuating conditions* make them ideally suited.

IN-SERVICE FLEXIBILITY

We purposely made the Tufline basic body construction easily adaptable to a bottom-entry third port—and additional side ports as needed. Thus you can obtain *up to 5-way operation within the original 2-way face-to-face dimensions.*

Besides conventional wrench operation, 3" and larger valves have quick operating gearing with a "T" wrench. Their assured operation also makes Tufline valves well suited to all modes of remote control—extended and 45° offset wrenches, chain operation, and hydraulic, pneumatic or electric actuators.

Tufline valves can easily be modified for specialized use. For example, some time ago we furnished specially jacketed valves for both cooling and heating. They performed so well that we have recently added this design to our standard Continental line.

In short, Tufline valves now offer, within their range of application, fool-proof operation and tight shut-off for a wide variety of process services. All this adds up to new operating efficiency and economy when Tufline valves are used.

SPECIFICATIONS

Tufline valves, 150# and 300# class, are designed to handle a wide range of media, from hard-to-hold light gases and solvents to heavy slurries and corrosive liquids. They provide trouble-free service over the temperature range minus 150° F to plus 400° F, from high vacuum to 615 psi pressure (depending on temperature).

Built to meet MSS-SP42 specifications, Tufline valves are available with screwed or flanged ends. The flanged-end design (faced as specified) has the same face-to-face dimensions as standard plug or gate valves. Flange and body thickness meet ASA standards.

Sizes from ½"-6" can be furnished in a variety of body materials including carbon and stainless steels, Hastelloys, nickel, monel, bronze, aluminum and ductile iron.

For additional information write me at Continental Manufacturing Co., 247 Park Ave., N. Y. 17, N. Y. Let me know if you would like to have one of our field sales engineers call.

TUFLINE
PLUG VALVES
CONTINENTAL MFG. CO.
9216 Floral Ave., Cincinnati 42, Ohio
Offices in principal cities

TEFLON is a registered trademark of E. I. Dupont de Nemours & Co., Inc. *T.M. Reg.

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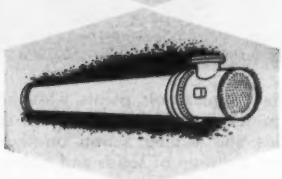
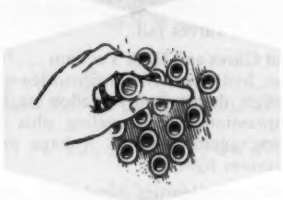
Lengthen Condenser and Heat Exchanger Life

John Crane®

Plastic* Tube Protectors



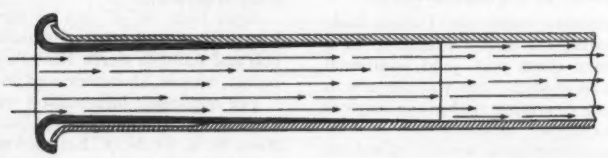


- Protect tube ends for life of tube.
- Positively prevent erosion and abrasion.
- Reduce costly tube maintenance and replacement.
- Easy to install—just slip into tube inlet after coating outer surface with cement.

* Nylon, Polyethylene or Phenolic Resin

PLUS EXCLUSIVE FREE-FLOW DESIGN

Wall thickness gradually tapers toward discharge end. Assures smoothest possible water flow, eliminates turbulence.



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with which is combined
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and Chemical Business

For the management team

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over the editor's shoulder

Financial shadow darkens automatic-processing picture

The future of fully automatic control in the chemical processing industries is being hotly debated these days. Kicking off our annual Instrumentation Feature, on page 85, is an analysis of this topic, based on a survey of leaders in the CPI and computer fields.

Evidently, much closely cooperative digging remains to be done by computer manufacturers and chemical firms before a wholesale leap is made into the brave new world of pushbutton processing. Nevertheless, programming symbols seem to be road signs of the industry's future.

This is as it should be. Unquestionably, the burgeoning foreign economies will light the fire of economic incentive under laggards. So far, so good, but this is going to cost money—lots of it.

In fact, according to William R. White, of Hornblower & Weeks, "automation" is a principal factor contributing to an expected 1959 industrial-capital-expenditure figure in excess of $34 billion. His predictions, appearing on page 18, call for even higher levels in 1960 and 61.

But the needed capital just isn't going to be there if the Government doesn't conduct a painstaking re-evaluation of its outmoded depreciation and tax policy. This is the opinion of Thomas C. Davis, a DuPont vice president who presents his viewpoints on page 30.

Of course, CHEMICAL PROCESSING has been keeping a stethoscope on the heart of the chemical-industry phase of this second industrial revolution by means of various New Solution articles.

This continuing service provides the reader with on-the-spot coverage of successful working applications of process-control devices (and, of course, many other types of equipment and materials). Future stories will keep tabs on "automated" processing applications as they occur.

George W. Bangs

Assistant Editor

When your new plant goes "on stream"...

...benefit from the proven advantages of a PITTSBURGH GRANULAR ACTIVATED CARBON Adsorption System!

Are you planning new processing facilities for liquid or vapor phase adsorption? If so, you should be acquainted with the unique and *proven* advantages of a continuous column system using PITTSBURGH Granular Activated Carbons.

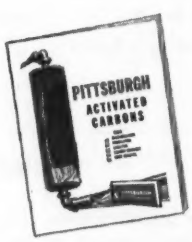
Here are just a few typical applications where such a unit operation can improve efficiency and reduce costs:

1. Incoming Materials: Removal of impurities from process water, gases and other raw materials.

2. Materials in Process: Purification or decolorization of prime products. Purification or recovery of valuable solvents used repeatedly in recirculating streams. Catalysis and catalytic support.

3. Plant Effluents: Treatment of waste gases and liquids to recover valuable constituents or to eliminate pollution problems.

If you're planning new or improved adsorption facilities at your plant, it will pay you to talk to a PITTSBURGH Technical Representative. He has helpful engineering data and case history studies which demonstrate how you can benefit by the use of PITTSBURGH Granular Carbons in a continuous column system.



Want More Information? Send for This Booklet

Describes various types of liquid and vapor phase adsorption operations . . . and types of Pittsburgh Granular Carbons best suited for each one. Send for your free copy. Write to Dept. Q.

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highlights

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CHEMICAL PROCESSING

SEPTEMBER 1959
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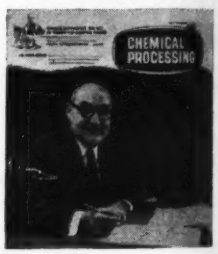
THIS MONTH'S COVER



Carl Prutton, executive vice president of FMC, in charge of the Chemical Divisions, first announced his master plan of reorganization but 16 months ago. Since then, organizational lines have been streamlined and strengthened. A youthful, aggressive management team is now in action. But through all runs Prutton's philosophy of leadership which emphasizes full use and build-up of people's abilities.

The CB Profile in this issue—page 27—studies each major step of this reshaping program . . . analyzes its present and future import to the Corporation.

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Spotlight On People

HAROLD BLANCKE, president of Celanese Corporation of America, is elected chairman, and GEORGE SCHNEIDER, senior vice president, is named vice chairman. Mr. Blancke will continue to serve in the presidency as the company's chief executive officer. FRED LUSS is appointed president of the newly formed Celanese Development Company, established to evaluate potential new marketing areas and expansion opportunities for the parent company. Named vice presidents are BJORN ANDERSEN, EMERY N. CLEAVES, and WILLIAM L. O'DONOVAN, formerly vice presidents of Celanese, and HARRISON C. GIVENS, formerly vice president of Celanese International Corporation. WILLIAM M. SHINE is named technical director of the new company.

At Monsanto Chemical Company, CHARLES H. SOMMER is elected executive vice president, a member of the board, and also a member of the executive committee; ROBERT M. MORRIS is named a vice president. The latter also was appointed to succeed Mr. Sommer as general manager of the Organic Chemicals Division. HERBERT S. PARHAM is named director of marketing of the division.

Allied Chemical Corporation's board of directors has elected KERBY H. FISK board chairman and chief executive officer; HARRY S. FERGUSON, chairman of the executive committee and chief administrative officer; and CHESTER M. BROWN president and chief operating officer. Appointments are effective this month upon retirement of GLEN B. MILLER, president.

FREDERICK G. LAW is elected a vice president of Columbian Carbon Company. He is president and a director of Fred'k H. Levey Company, Inc., a wholly owned subsidiary, as well as a director of the parent company.

The Vickers Petroleum Co., Inc. announces election of JAMES W. VICKERS as executive vice president. He for-

To page 10

Two ways of providing EXPOSURE PROTECTION

TOO LATE ▲
to prevent serious heat exposure, a valiant attempt is made by firefighters to prevent rupture of tankage, not already involved in flames, with relatively ineffective hose streams.

GRINNELL WATER SPRAY SYSTEM ▶
shown under test at the Marietta, Ohio plant of the Bakelite Union Carbide Plastic Company, a division of the Union Carbide Corporation. Water – when it is applied in time and distributed over the surfaces efficiently by a properly engineered system – is most effective in limiting tank fires and controlling their spread.

Proper safeguards are uppermost in importance in protecting tanks which contain gases and flammable liquids in the event of fire. For example, tanks must be guarded against extreme heat exposure. Leaking gas, if it should develop, must be diluted to the point where it will not burn. And fire, if it should occur, must be localized and controlled or extinguished.

With a Grinnell Water Spray System, you get protection against all these eventualities.

Before heat raises tank temperatures dangerously, an enveloping spray of water provides instant cooling, reducing internal pressure which helps prevent rupture. In addition, air turbulence is created (even in still air) which, in conjunction with the water vapor from the spray, helps dilute the flammable vapors controlling or extinguishing the fire. Flammable products which cannot be safely extinguished can be burned off under the protecting water spray with no damage to adjacent protected equipment.

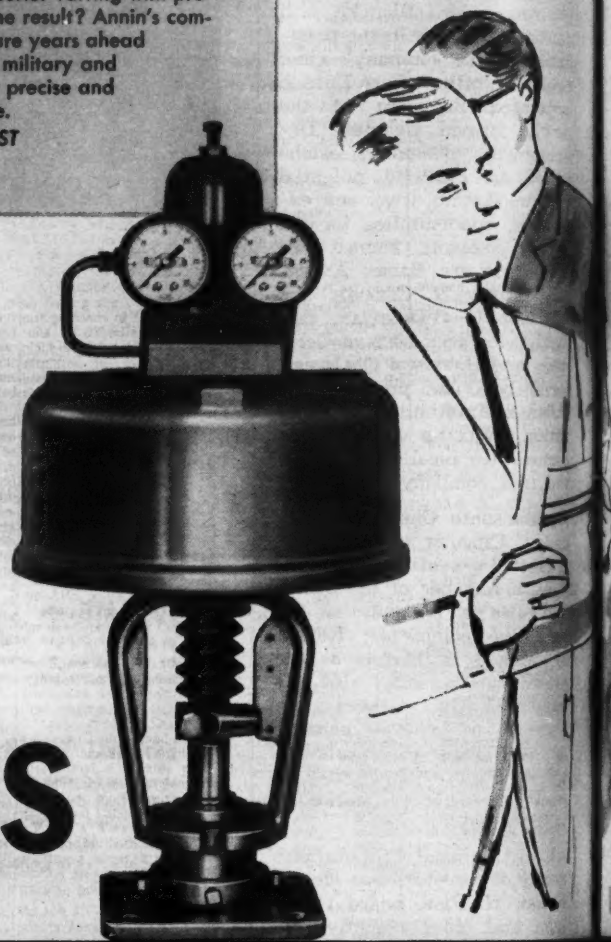
There is a Grinnell Fire Protection System for every fire hazard. Call on Grinnell for advice about the one suited to your needs. Grinnell Company, Inc., 277 West Exchange Street, Providence 1, R. I.

GRINNELL FIRE PROTECTION SYSTEMS SINCE 1870

Check 3701 opposite last page.

Wherever control engineers gather, Annin Valves are the center of attraction ... Annin features the most talked about. In the development of Annin Valve bodies and actuators, Annin engineers anticipated the exacting demands of today's technology for new concepts ... new high standards of performance ... in fluid flow control. They foresaw the requirements for superior valving with precision positioning and dynamic response characteristics. The result? Annin's complete line of bodies and actuators, like those shown here, are years ahead of the industry. As new headlines tell of new advances in military and industrial automation, Annin is ready to meet the need for precise and powerful control elements with the finest designs available.

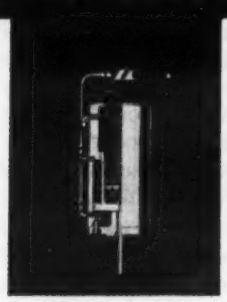
Write today for Annin's latest Actuator Bulletin No. 1236ST



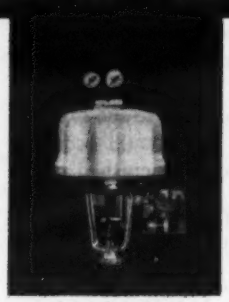
SPACE AGE AUTOMATION REQUIRES THE PRECISE POSITIONING AND DYNAMIC RESPONSE OF

Annin VALVE ACTUATORS

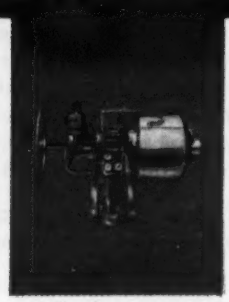
ON DISPLAY AT THE 14TH ANNUAL ISA INSTRUMENT



600 Series Actuator

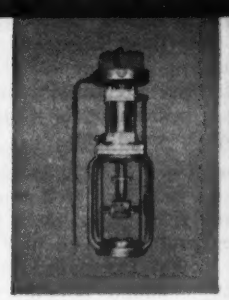


Electro Pneumatic Domotor Actuator



Toggle Actuator

Pneumatic Hydraulic Actuator



Electro Hydraulic Actuator

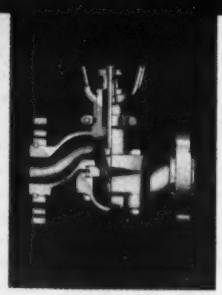
THE ANNIN COMPANY

Annin

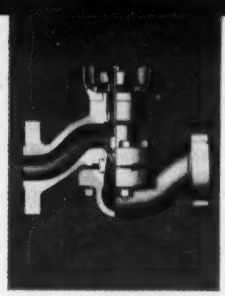
THE MOST ADVANCED FEATURES
IN MODERN VALVE DESIGN
ARE COMBINED IN

Annin VALVE BODIES

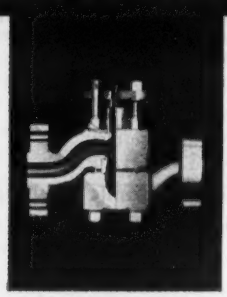
AUTOMATION CONFERENCE AND EXHIBIT...BOOTH 454



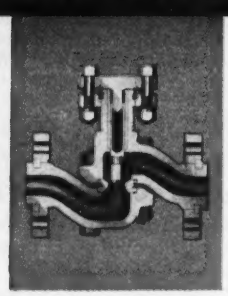
15 Group Body
600 lb. ASA rating



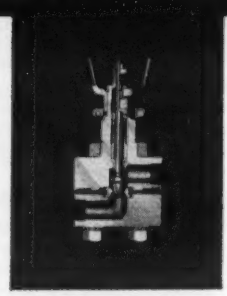
45 Group Body
1500 lb. ASA rating



65 Group Body
2500 lb. ASA rating



Check Valve Body
600 to 2500 lb. ASA ratings

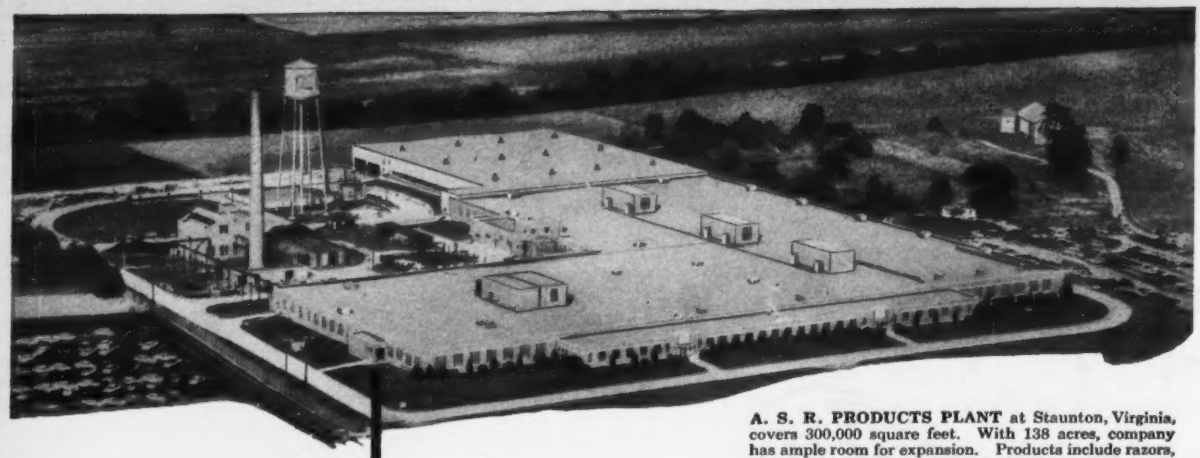


34 Group Body
2500 and 10000 lb. ratings

VALVES

THE ANNIN COMPANY
1040 S. Vail Avenue, Montebello, California

Check 3702 opposite last page.



A. S. R. PRODUCTS PLANT at Staunton, Virginia, covers 300,000 square feet. With 138 acres, company has ample room for expansion. Products include razors, blades, plastics, sterile surgical blades, carpet industry blades.

NATIONAL SAFETY AWARD has been won by the plant for the past two years. Virginians learn new skills quickly. For example, A. S. R. is now training its own tool and die makers at the plant.

TRANSFERRED EMPLOYEES love the good living and mild climate . . . enjoy the hunting, fishing and outdoor life. Executives are Virginia enthusiasts, too.

These Companies Benefit From PLANTS IN VIRGINIA

- General Electric Co.
- I. T. & T. Corp.
- Dow Chemical Co.
- Babcock & Wilcox Co.
- Sperry Piedmont Co.
- American Oil Co.
- Allied Chemical Corp.

Ask Them Why They Chose Virginia!

"Productivity has never been so good. Absenteeism has never been so low."

says A.S.R. Products Corporation after its move to ***Virginia***

To make way for a proposed civic center, A. S. R. Products had to relocate their plant. After receiving bids from 50 to 60 localities, the company made a thorough study of 20 to 25 sites. Department heads visited the various sites and reported on taxes, transportation, power, water and many other factors. Employing almost 1000 people, special attention was given by A. S. R. to availability of manpower, the number of schools and churches, housing . . . everything pertaining to people. After adding up the "score" on each site, Staunton, Virginia, won hands down. Among the deciding factors were Staunton's excellent location as a distribution center and Virginia's tax laws which, considered in their entirety, were found to be very reasonable.

Highest production ever

But it was *after* the move that the real wisdom of this choice became apparent. With almost 200 employees transferred and another 800 hired locally, productivity jumped so sharply that A. S. R. is hesitant to release the figure. They will admit that absenteeism is 1.8% compared to a national average of around 5%. In the words of an A. S. R. executive, "It's been almost too good to be true."

Let us tell you more about the high productivity, the dependability of people in Virginia . . . and about the many other advantages of locating in this state. In confidence, phone, wire or write . . .

C. M. Nicholson, Jr., Commissioner
DIVISION OF INDUSTRIAL DEVELOPMENT
Virginia Dept. of Conservation and Economic Development
State Office Building, Richmond, Va., Telephone: Milton 4-4111 Ext. 2255

You, too, can find these... and many other great competitive advantages in

VIRGINIA

Whatever The Season, There's Always A Reason To Visit Virginia

Check 3703 opposite last page.

PEOPLE

From page 7

merly was vice president, marketing. JAMES A. DOCTOR, formerly vice president, marketing, The Champlain Oil and Refining Co., is elected Vickers vice president, marketing.

H. R. WALL is the new president and chief executive officer of Continental Carbon Company. He succeeds ROBERT I. WISHNICK, elected to the newly created position of Continental's board chairman.

In changes in the top management structure in the Kaiser industrial group, D. A. RHOADES is named president and chief executive officer of Kaiser Aluminum & Chemical Corporation. He formerly was vice president and general manager.

H. L. REICHART JR. is appointed vice president and general manager of Carbide Chemicals Company, Division of Union Carbide Canada Limited.

HAROLD J. ROSE is elected a vice president of Esso Export Corporation. He also will serve as general manager of a new chemicals department being formed by Esso Export.

American Smelting and Refining Company announces appointment of HANS STAUFFER as a member of the board of directors. Mr. Stauffer is president and a director of Stauffer Chemical Company.

In an expansion of the executive staff of Dow Chemical International Limited S. A., MAX KEY, plastics production manager of the Dow Midland (Mich.) Division, is named operations vice president. Appointed group vice presidents are A. M. GRISWOLD, vice president of Dow International, and E. K. STILBERT, manager of coatings materials for the Dow plastics department.

J. A. TALLANT is named managing director of Phillips Carbon Black Company (Proprietary) Ltd., a company formed recently by Phillips Petroleum Company and In-

dustrial Development Corporation of South Africa, Ltd.

Petroleum Chemicals, Inc. announces election of J. Howard Olehy as vice president.

E. S. Twining Jr., manager, gas department-marketing, is appointed vice president-marketing of Air Reduction Sales Company, a division of Air Reduction Company, Incorporated.

At Ansbacher-Siegle Corporation, a division of Sun Chemical Corporation, Frank W. May is named vice president and general manager.

William F. Drees is elected a vice president of Formica Corporation, a subsidiary of The American Cyanamid Company.

M. E. Lewis is named general manager of Armour Industrial Chemical Company, a newly formed grouping of Armour and Company.

Nalco Chemical Company names Dr. David G. Braithwaite vice president, as head of commercial development. E. H. McGrew succeeds Dr. Braithwaite as general manager of the catalyst division, which the latter also headed.

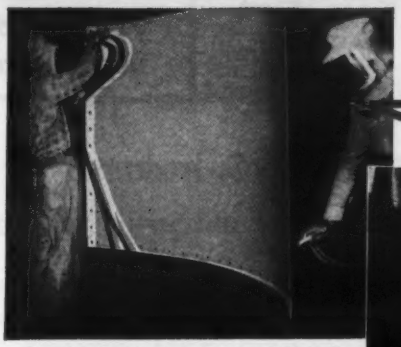
George T. Stribling is appointed manager of sales for the Baker & Adamson line of laboratory reagents and fine chemicals of General Chemical Division, Allied Chemical Corporation.

At Ansul Chemical Company, William R. Rinelli is the new general manager of the Chemical Products Division.

Dr. Robert Q. Parks is promoted to general manager of Grace Chemical Division, W. R. Grace & Co. Frank J. Ronan succeeds Dr. Parks as general sales manager.

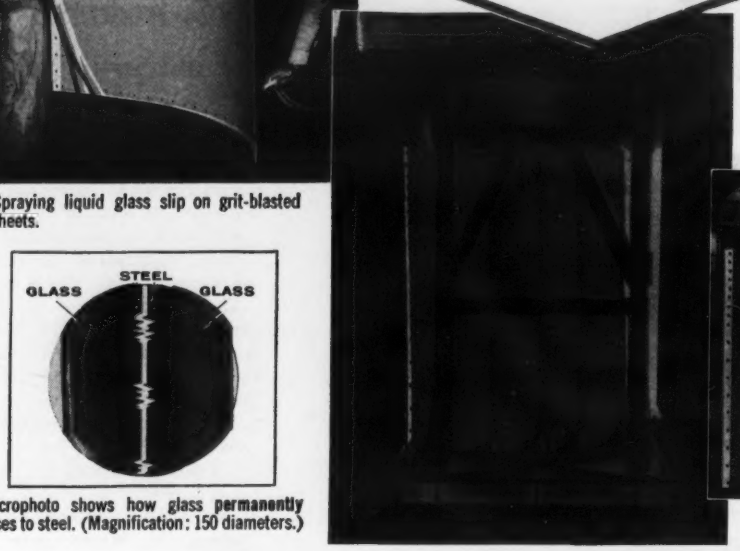
George F. Halfacre is elected vice president in charge of manufacturing of The New Jersey Zinc Company.

General Aniline & Film Corporation announces appointment of Stanley Lewis as director of marketing.



Spraying liquid glass slip on grit-blasted sheets.

this wedding of glass to steel...



Glass is fused to the steel at temperatures in excess of 1,600° F.

Microphoto shows how glass permanently fuses to steel. (Magnification: 150 diameters.)

Inspection of the finished sheet.

. . . guards your bulk materials with permanence of steel—purity of glass*

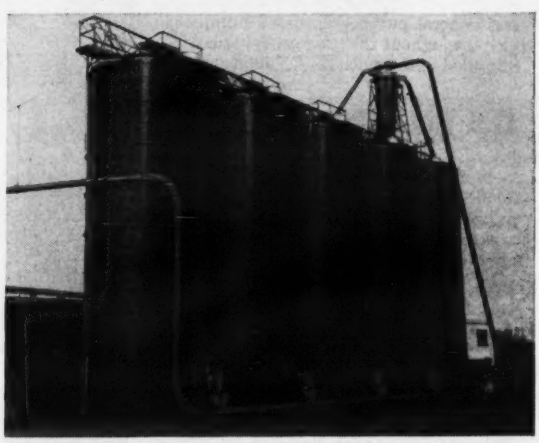
The permanent bonding of glass fused-to-steel *inside* and *out* —exclusive with Permaglas MECHANIZED STORAGE UNITS!

Think of it! A clean, gleaming coat of glass . . . permanently bonded to steel at temperatures in excess of 1,600° F., with bond strength up to 20,000 psi. This impervious glass has the same coefficient of expansion as steel itself . . . withstands weathering and abrading of bulk materials.

This *exclusive* feature of *Permaglas* Mechanized Storage Units makes possible sanitary, easy-to-clean bulk materials handling systems. Eliminates ravages of corrosion . . . deterioration of stored materials. Virtually ends maintenance costs! Another *exclusive* feature: Sweep-arm bottom unloaders completely mechanize bulk materials handling . . . cut labor costs as much as 67%.

Mail coupon today for full details on this new cost-saving way to process and store bulk materials.

*HYDRASTEEL—Process covered by U.S. Patent No. 2,754,222



Exclusive mechanical sweep-arm bottom unloaders, automatically discharge bulk materials into the conveying system in the Permaglas Storage Unit System shown above. Incoming bulk materials are top-loaded directly into the Permaglas Units.

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A. O. SMITH CORPORATION, Dept. CP-99
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Please have Permaglas System Planning Service Representative call for appointment. Send me free Permaglas Mechanized Storage Unit Bulletin MU-100.

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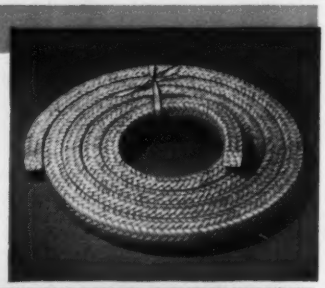
Check 3704 opposite last page.

How will you have your TEFLON packing

BELMONT TEFLON* Packings—impervious to acids, caustics, oxidants, solvents, for long troublefree life in the most difficult service—are offered in a wide variety of forms to best suit each individual requirement. Select your needs from the *most complete line* and get *exactly* what you want. Your Belmont Packing Distributor is ready to serve you. Or write for Catalog T-57.

BRAIDED

Belmont braided Teflon yarn (No. 3085) and Teflon ribbon (No. 3055) are offered with the rugged mechanical structure of Belmont's unique CRISS-CROSS Braid that will not ravel, wear through, slough off. Each strand criss-crosses diagonally through the body of the packing, becoming an integral part of the whole. Supplied in coil, reel and ring form.



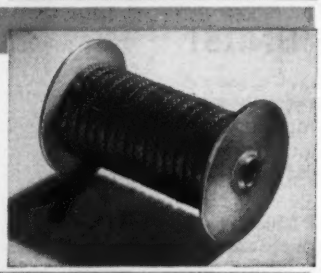
MOLDED

Belmont Pump Packing Rings, molded from shredded pure Teflon with Teflon suspensoid (No. 3062) and impregnated with graphite (No. 3061) serve the requirements for both non-contaminating and general purpose chemical pump service throughout the processing industries. Supplied in sets with solid Teflon spacers.

EXTRUDED

Belmont Extruded Teflon Packing (No. 3060-C) is shredded pure Teflon, impregnated with graphite and reinforced with a skeleton jacket of Teflon yarn. Available in reels and continuous lengths.

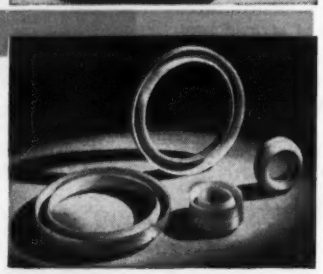
Belmont Bulk Packing (No. 3060-B) is shredded pure Teflon with graphite. Available in ½, 1 and 5-lb cans.



SOLID Rings

Belmont Solid Teflon Packings are offered in 3 designs—V-Rings (No. 3105), cup and cone (No. 3115) and wedge type (No. 3115-X). All provide a tight seal at low gland pressure and minimum friction on valve stem. Offered in sets, with square end adaptors where required.

*du Pont Trademark



The Belmont Packing and Rubber Company • Butler & Sepviva Sts., Phila. 37, Pa.

BELMONT

Check 3705 opposite last page.

Watching Washington

U. S.-Industry Project Looms for Atomic Shale Oil Recovery

Chemical and oil producers can look for an invitation this fall from the Department of Interior to a meeting that hopefully would pin down joint participation in a nuclear explosives experiment to recover oil from shale.

An Interior spokesman told CHEMICAL PROCESSING that a formal cooperative agreement may be presented to industry at the meeting, for which no definite date has yet been set.

The proposed experiment, expected to cost about $2½ million, would be carried out as part of the Atomic Energy Commission's "Plowshare" program to develop peaceful uses for the atom.

Oil-shale technology in the United States is in an early stage of development. But the Bureau of Mines says improvements in conventional methods of recovery probably will not result in spectacular cost reductions.

Rather, it believes, new and unconventional methods may be the answer. For example, underground nuclear explosions followed by in-place retorting (heat conversion of a solid to a liquid) could accomplish the following:

1) Eliminate the need for mining (except for site preparation). This accounts for about 50 percent of the present cost of producing shale oil.

2) Eliminate the need for shale preparation in plant facilities, which accounts for 15 percent of the cost.

3) In effect, construct an underground retort already charged with broken shale, and ready to ignite, without large investment of plant capital. This could reduce retorting costs, which currently make up 35 percent of the total cost.

In addition to these benefits, there is the possibility, the bureau says, that the use of nuclear explosives could make available shale oil from strata now considered too lean or too deep to mine and process economically. The nuclear technique also could eliminate the problem of spent shale disposal, an important and costly item when shale oil is produced on a large scale. Spent shale amounts to some 85 percent of total shale processed.

Experiments Only Way

Actual net reduction in over-all cost of producing shale oil by this means can be determined only by experiments. Potential benefits described will cost considerable money. Sites must be prepared for nuclear detonations, for fabricating and firing the device, and for conducting post-shot exploration to determine results before planning an oil recovery program. Other costs will be involved in producing oil from broken shale in the ground.

One major problem as yet unresolved is the extent of radioactive contamination. The AEC has found that all underground detonations of nuclear devices cause radioactive contamination of oil or groundwater in the immediate area. AEC experience based on underground explosions indicates there would be no release of radioactivity to the atmosphere. The commission is optimistic that water and oil contamination problems can be solved.

While no site has yet been selected, studies are under way in Colorado, Utah, and Wyoming, where the largest oil shale deposits have been found. Companies with leases on oil shale lands are watching with interest the site selection activities.

In picking a site, the government will take into consideration these factors:

a) It should be a safe dis-

tance from existing installations and habitations.

b) Point of detonation must be at a sufficient distance from the nearest surface to insure complete containment.

c) Shale broken in the experiment must be of reasonable richness. Site and size of the device must be such that broken shale will average about 25 gal of oil to a ton.

d) Radioactive fission products should not contaminate groundwater.

e) It should be located so as not to affect oil- or gas-containing structures.

f) It should be readily accessible to permit easy transportation of necessary equipment.

Opinions Sought

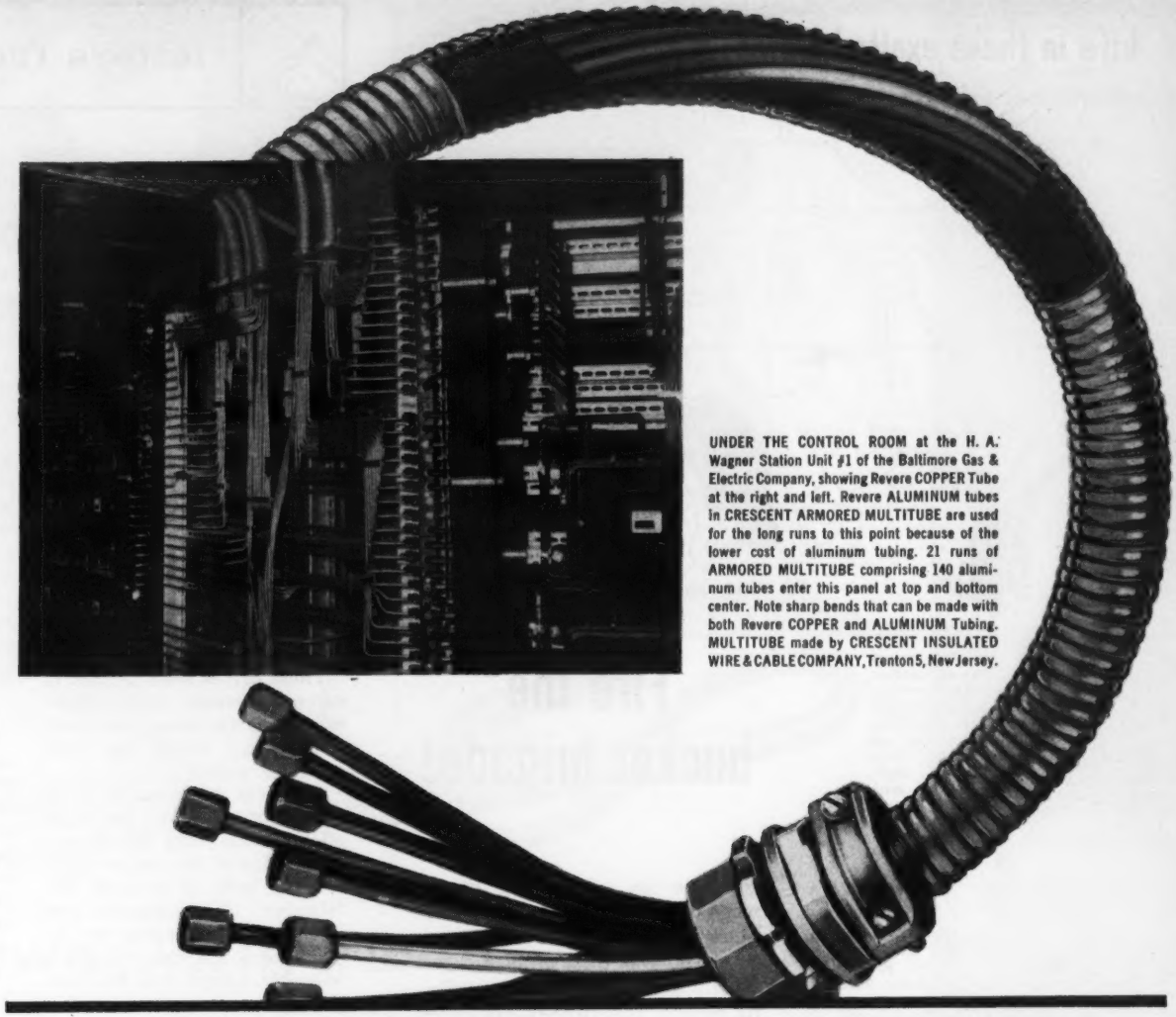
The proposed project, as outlined above, was unveiled at a two-day meeting held earlier this year in Dallas. Following the meeting, Bureau of Mines queried some 70 firms and individuals for their opinions on the project, and whether industry would be willing to share costs on an equal basis with the government.

The bureau reported that out of 23 companies which so far have responded, all but two indicated the project should proceed. Several expressed "willingness to participate and help finance at least part of the project," the bureau said.

What Interior describes as a "generally favorable" attitude has encouraged the department to step up plans for launching the experiment.

If the contemplated second meeting comes off, the government would offer industry a cooperative agreement that would cover only the detonation of a nuclear device and the work necessary to evaluate effect of the explosion on oil shale formations.

This is phase No. 1 of the experiment, expected to cost $1 million, or less than one-half of the total. The second phase, the actual oil recovery, will depend on a thorough study of the character and effects of what happens when the detonation is completed.



UNDER THE CONTROL ROOM at the H. A. Wagner Station Unit #1 of the Baltimore Gas & Electric Company, showing Revere COPPER Tube at the right and left. Revere ALUMINUM tubes in CRESCENT ARMORED MULTITUBE are used for the long runs to this point because of the lower cost of aluminum tubing. 21 runs of ARMORED MULTITUBE comprising 140 aluminum tubes enter this panel at top and bottom center. Note sharp bends that can be made with both Revere COPPER and ALUMINUM Tubing. MULTITUBE made by CRESCENT INSULATED WIRE & CABLE COMPANY, Trenton 5, New Jersey.

CRESCENT relies on REVERE

for dependable performance of its instrumentation and control tubing

REPORTS, "NOT ONE FAILURE."

The dependable performance of Revere Copper Tube in Crescent Armored Multitube*, ever since its inception, has led the CRESCENT INSULATED WIRE & CABLE COMPANY to fill its aluminum tube needs with Revere also.

In fact, Crescent, since it first started using Revere Copper Tube in 1953, reports not a single failure. And that's mighty important in instrumentation and control tubing service where utilities, chemical processing, petroleum, paper and similar industries can't afford the luxury of process failures.

Crescent Multitube, using either Revere Copper or Aluminum Tube, or both in combination, offers a completely protected installation for permanence, lower original installation cost, lower maintenance and a saving of time, space and money.

Crescent Armored Multitube consists of a group of Revere Copper or Aluminum Tubes, twisted together in cable form, protected by a flexible interlocked galvanized steel armor. Constructions are available employing plastic sheaths in combination with the armor for corrosive locations. Section of cabled tube pictured shows how Copper or Aluminum Tubes are encased inside the Armored Multitube. As many as 37 tubes of ¼" OD can be cabled in lengths up to 1,000 ft.

For details on Multitube write Crescent and for uniform quality copper and aluminum tube, speedily delivered, see the nearest Revere Sales Office. *Reg. Trademark

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Highest pumping efficiency, with faultless corrosion resistance. Hard rubber casing and impeller; Hastelloy *C* shaft. 80 gpm. *Bul. CE-55.*

Fire the bucket brigade!

No time for passing the bucket when corrosion threatens. With one quick decision you put an end to 85 to 100% of these problems. Just specify *Ace* chemical-resistant plastic piping and rubber-protected equipment. The long-term cost is a drop in the bucket. American Hard Rubber Company's 108 years of experience is at your service.

Liquids never touch metal in Ace diaphragm valves! Rubber or plastic-lined cast iron, or solid plastic bodies. Sizes ½ to 6". Ask for facts.

High-impact, rubber-plastic, most economical for average chemicals. ½ to 6". Screw or solvent welded fittings. Valves ½ to 2". NSF-approved. *Bul. 80A.*

All-purpose rigid PVC. Sched. 40, 80 & 120, ½ to 4". Threaded or socket-weld fittings. Valves ½ to 2". NSF-approved. *Free Bul. CE-56.*

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
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Check 3707 opposite last page.

letters from readers

CP political articles lauded by reader

Dear Mr. Vaaler:

The recent articles CHEMICAL PROCESSING has been running on political subjects have been interesting and should be encouraged.

You are no doubt aware of the drive being made by such organizations as the Effective Citizens Organization, the Chamber of Commerce of the United States, the National Association of Manufacturers, and the American Management Association to educate businessmen for active participation in the political work of the party of their choice.

These drives seem certain to succeed because with education in party ways come self-confidence, which in turn leads to action.

Knowing how to do it is important, of course, but to be effective one must also have a knowledge of the issues which are the basis of political differences. Your articles give help in understanding the issues, and for this they are valuable. I hope you will continue them.

PAUL A. KRUEGER
St. Louis, Mo.

AEC general manager comments on A-waste

Dear Sir:

Referring to Mr. Auchincloss' article on radioactive waste disposal regulations (July CP, page 23), I want to emphasize that protection of the public health and safety is the overriding consideration in the management and administration of all atomic energy operations including those concerned with radioactive waste disposal.

Our regulations are "restrictive" only to the degree that restrictions are believed to be necessary to assure safety. Meanwhile, the over-all problems involved in waste management, both from the standpoint of safety and economics, are being continually evaluated by the Atomic Energy Commission.

In this effort we rely in part on the ingenuity of everyone concerned with this problem to help toward the discovery of new approaches and toward the refinement of present methods.

I believe that while the problems of waste management must receive continuing and detailed consideration, the situation at present and the future prospects are such that these problems need not be a hinderance to a realization of the full potential of the peaceful uses of radioisotopes.

Disposal Rules Cited

Commission regulations governing use of radioisotopes by licensees permit the disposal of very low levels of radioactivity by discharge into the sanitary sewer system and by burial in the soil. Also, these regulations permit the release of effluents into air and water within certain specified concentrations. All of these limits are low enough to be safe under any conceivable conditions.

Regulations also provide that a licensee may request approval from the commission to dispose of radioactive wastes in higher concentrations than those listed in the regulations or by methods other than those specified, provided the applicant can demonstrate that the basic standards in the regulation will not be exceeded.

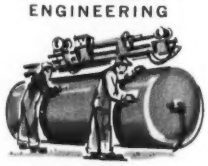
Thus, under a specific set of conditions where information on certain environmental conditions is known, the commission will allow a licensee to take advantage of the dilution and dispersal capabilities of the environment.

At the request of the commission, the National Acade-

For more information on product at right, specify 3708 . . . see information request blank opposite last page.

Have Crews...will travel

ENGINEERING



FABRICATION

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Our field crews at Solar Chicago are craftsmen capable of handling the erection and construction of pressure vessels, towers, tanks, shells or other structures. These men have stacked up years of experience and have been organized into highly efficient mobile crews ready to tackle the toughest job. They find it no problem to translate your needs into the structure you require on your site, on time.

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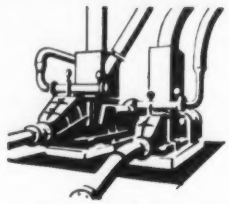
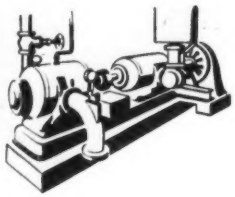
for the process industries

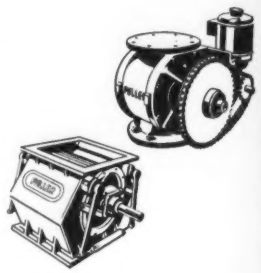


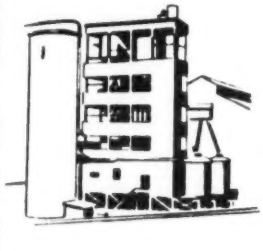
Pneumatic Materials Handling Systems. Widely specified throughout the process industries, Fuller's range of equipment offers best single source for solving problems in moving dry bulk materials pneumatically. Fuller-Kinyon Pumping Systems, Airveyor® Pressure and Vacuum Conveying Systems, and F-H Airslide® Fluidizing Conveyors are completely sealed to prevent both contamination of the product and any leakage of dust, etc., into the surrounding area. They are used to move dry, granular and pulverized materials to and from cars, ships, trailers, storage and processing points.



Fuller Rotary Compressors and Vacuum Pumps are vibration-free, can be installed anywhere, even on balconies. Fewer moving parts mean minimum maintenance. Compressors and Vacuum Pumps handle air and gases from 30 to 3300 cfm at pressures to 125 lb. gage. Vacuums to 29.95 in. (referred to 30-in. barometer).

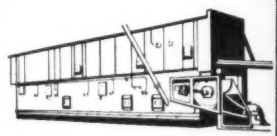
Fuller Vane-type and Roll Feeders . . . for volumetrically controlled feeding of a wide range of dry pulverized or granular materials. Also Fuller Rotary Valves . . . used under silo deck slabs and bins to permit the free flow of pulverized materials which tend to arch, such as lime and cement raw materials.





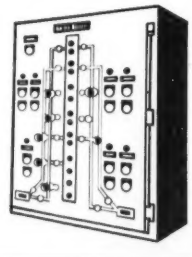
Fuller Preheaters, Humboldt Suspension Type . . . for preheating dry, pulverized Portland cement raw materials with rotary kiln waste gases.

Fuller Horizontal and Inclined Grate Coolers are compact, easily installed for fast, efficient cooling of materials such as nodulized phosphate rock, pebble lime, ores, dolomite, iron nodules and Portland cement clinker from 2800°F. or higher to any desired point within a reasonable range of atmospheric temperature.



Fuller-Material-Level Indicators signal audibly and visibly when materials reach a predetermined high or low level. Controls conveyor motors, valve circuits, etc.

Fuller Control Panels permit automatic, remote, one-man control of multiple operations. Easily-read panel permits visualizing flow of material to storage or from process bins.



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Check 3709 opposite last page.

my of Sciences — National Research Council, Committee on Oceanography, has looked into the feasibility of disposing of low-level radioactive waste in a number of inshore areas along the Atlantic and Pacific Coasts and the Gulf of Mexico.

Suitable Locations Found

The committee's report on its evaluation in regard to the Atlantic Ocean and the Gulf is now in press. I understand that the report indicates some 20 inshore locations along the Atlantic and Gulf Coasts that would be suitable for the disposal of low-level wastes.

These inshore locations have depths of tens to hundreds of fathoms and are at distances from the coast extending from about 15 miles. The use of these areas on the East Coast would save considerable mileage per disposal trip, since the 1000-fathom line is approximately 120 to 150 miles from shore.

As a further means of dealing with the solid or packaged waste disposal problem, the commission is considering the establishment of regional land burial areas throughout the United States. A number of areas having desirable characteristics for disposal of such wastes are now being given detailed consideration.

Obviously the packaging requirements, particularly with regard to weight, would not be as critical in this system as for sea disposal.

A. R. LUEDECKE
General Manager
Atomic Energy Commission
Washington, D.C.

'Hot' waste disposal held 'not really a problem'

Dear Sir:

With reference to S. S. Auchincloss' article on atomic waste disposal regulations, I believe—so far as strictly scientific matters are concerned—that the quantities of materials are generally so small that waste disposal is

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Check 3710 opposite last page.

not really a problem.

At least we have not found it so in the limited work we have done with active materials. On the other hand, there is no doubt that in planning large-scale commercial plants the waste disposal problem is a serious one.

We have a great deal to learn yet about the effects of such wastes in the areas in which they are dumped, and I think our authorities cannot be criticized for moving very cautiously. It would certainly be desirable, however, to make some progress toward a solution of the matter by careful study and experimentation.

JAMES B. AUSTIN
Administrative Vice President
Research and Technology
United States Steel Corp.
Pittsburgh, Pa.

Educator discloses peril in buying Red apparatus

Dear Editor:

I read with misgiving Watching Washington (July CP, page 11) regarding "dumping" by Russia of scientific apparatus in the American market.

It seems to me that when a good buyer selects one model in preference to its competitors, he strikes a balance of costs versus quality, applicability, service-availability, and output. This is the lifeblood of industry. Its professionals, business and technical, know the needs and can handle the selection. The best machine for the job is the one bought.

In education it is different, especially in the pre-college years. The person making decisions often does not have the technical background to decide among various models of scientific instruments.

His volume of business has in the past been too small for good salesmen to cultivate. His subordinates often have neither the training nor the experience to advise well. Consequently, price looms large. The lower the outlay the happier the administration. With federal aid and matching funds, he is induced — almost

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Check 3711 opposite last page.

seduced — to buy because he only has to pay half price.

The insinuation of imported Russian instruments into this picture lures his interest. Price is low — unrealistic even by American competitive practices. If it weren't for the obvious effort to unbalance a segment of the economy, if it weren't for the propaganda value, if it weren't for the impressionability of teenagers using such equipment, we could say: "Sic 'em, take the low price. Make Americans sharpen their own price-cutting knives." But the situation is more involved.

No Ordinary Competitor

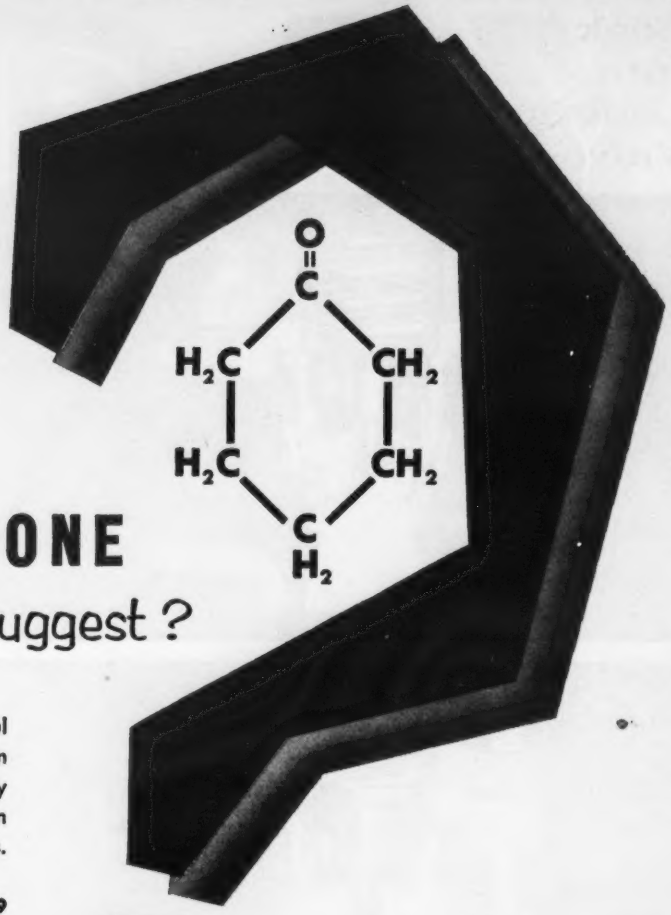
This producer is no ordinary competitor who could be made to pay for errors in business judgment. He is a hostile, conniving antagonist invading all forms of American and other democratic life.

He looks for holes in the dike that can be washed larger. He aims to emendate the world in the same manner he has treated segments already overrun. He cannot be allowed any opening unless we are ready to scrap much of our treasured traditions and hard-earned positions. We only aid him to ruin us when we allow school equipment bought with public monies to be bought on the basis of unrealistic prices.

The move to strike Russian- and Russian-satellite-produced scientific equipment from approved lists, where federal funds are involved, deserves the closest scrutiny. If international relations and military strategy prove to require protection of the economic market, then we shall have to admit that other factors outweigh price alone. In turn for the protection from this kind of threat, that segment of American industry being threatened should examine its own pricing structure and the increased volume of business under NDEA.

Dr. H. H. Bliss
Chairman
Oklahoma Science Service
University of Oklahoma
Norman, Okla.

how many new uses for **NADONE®** **CYCLOHEXANONE** does this structure suggest ?



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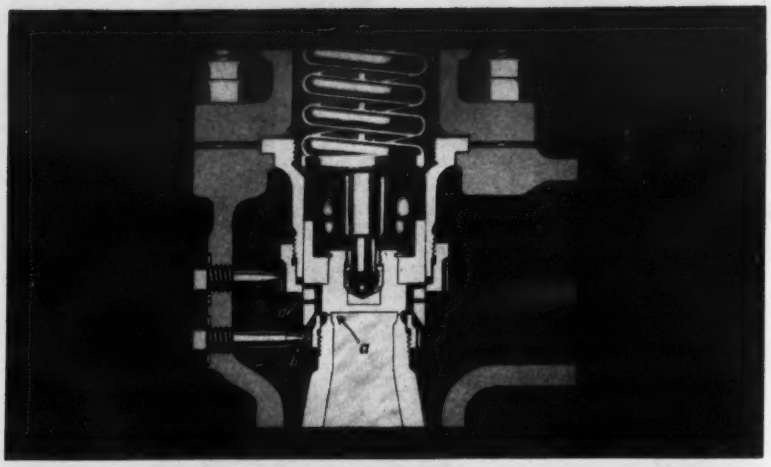
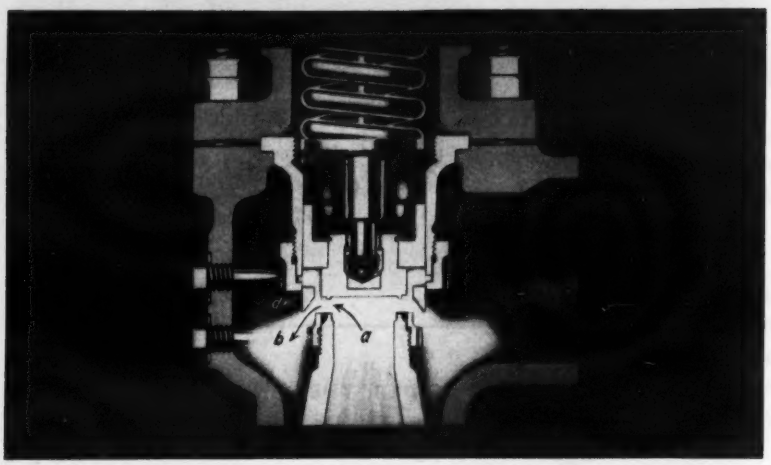
as an ingredient in more potent paint removers

for inks, adhesives, leather finishes, insecticides, pharmaceuticals and other compounds

Check 3712 opposite last page.

Look into Lonergan Valves





Top: Valve closed, ready to pop. Pressure confined within throat chamber. Bottom: Open. Full (D/4) lift obtained at standard over-pressure. Orifices (a) and (b) full open, port (d) sealed off. Full pressure on baffle area.

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Through the control principle shown here, Lonergan valves close cleanly, without shock and can be adjusted to the application requirements for either vessel or line, on blowdown.

The opening point of Lonergan valves is consistent. Capacity is assured. In addition, the non-shock closing eliminates damage to the seats, thus reducing maintenance and product loss due to seat leakage.

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Check 3713 opposite last page.

Capital Spending Programs May Top $34 Billion in '59

WILLIAM R. WHITE, Market Analyst
Hornblower & Weeks

One of the real surprises of this year's industrial recovery has been a vigorous reinstatement of capital spending programs. Instead of a decline that had been foreseen for 1959, it now seems evident that expenditures may exceed $34 billion — an increase of seven percent or more over last year. Moreover, all indications point to still higher levels in 1960 and 1961 with the likelihood of an all-time peak well in excess of totals recorded two years ago.

Two principal factors contributing to the more confident attitude toward the future are based on a desire to introduce new products developed in research laboratories and a need for automation of facilities to minimize production costs.

Bulk of appropriations this year is being directed into modernization of facilities. In fact, manufacturers' plans call for record expenditures in 1959 just for this purpose. In addition to enlargement and improvement of existing plants, many companies have indicated their intention to place greater emphasis on research. This is apparent especially in the chemical and machinery industries.

In view of the promising outlook for concerns supplying materials and equipment for projects of this kind, it may be well to consider typical companies that probably would benefit.

Carborundum Co.

As one of the three principal producers of manufactured abrasives widely used in virtually all segments of industry, the Carborundum Company finds its sales tend to follow closely fluctuations in industrial output.

The company has turned to rare metals in search of diversification and has entered into a contract to supply zirconium and hafnium sponge metal for the Atomic Energy Commission.

Increased emphasis in recent years on research and operating economies holds promise of more satisfactory earnings results. Net profit is being projected for this year at a figure well above the $2.21 a share of 1958, affording ample coverage for the $1.60 dividend rate.

Babcock & Wilcox

The Babcock & Wilcox Company should experience a pickup in orders in anticipation of expansion programs to take shape next year. Profit margins have improved. Indications point to a satisfactory recovery in net profit well above the $2.11 a share of 1958, which should encourage hope of improvement in the current $1 annual dividend rate.

General Refractories Co.

For representation in the steel industry, General Refractories Company has appeal. It stands to benefit from the steel industry's aggressive adoption of the oxygen converter process that permits substantial operating economies in steel making.

Earnings appear headed for a level of $4 to $4.25 a share this year and perhaps well above $5 a share next year.

Payments have held at the rate of $2 annually for almost four years, but extras in stock were distributed in 1956-57.

(For further information on chemical stocks write Hornblower & Weeks, 40 Wall St., New York 5, N.Y.)

Check 3714 opposite last page.

Stauffer Chemical, Victor Move Along Merger Path

Stauffer Chemical Company and **Victor Chemical Works** may become one. Directors of both have reached an agreement in principle for a merger subject to stockholder approval. Announcement of the proposal indicated formalities were being pushed to completion, at which time the plan of merger will be submitted to stockholders of both companies.

Under the proposal, one share of Stauffer common stock would be exchanged for each share of Victor common, resulting in issuance by Stauffer of an additional 1.7 million common shares. The plan contemplates that 3½% $100 Victor par value preferred shares would become 3½% $100 par value Stauffer preferreds.

Three members of the present Victor board of directors would be added to Stauffer's directorate. Victor would continue its headquarters in Chicago, with operations to be carried on as the Victor Chemical Division of Stauffer Chemical Company.

Less than a month before merger talk first was heard by the public, Victor announced it would begin construction soon of its ninth plant. It is to be built on Chicago's far Southwest Side, and will be a heavy-tonnage operation devoted to making bulk chemicals for industrial and agricultural uses. First unit due to be completed is a phosphoric acid facility. The other unit will incorporate facilities for making phosphates.

Montecatini is jumping feet first into the booming U. S. chemical industry with construction of a $10-million plant to produce isotactic polypropylene and other polyolefins used in plastics, textile fibers and yarns, and elastomers.

Facility will be built on the Big Sandy River in Neal, W. Va. It will be operated by Novamont Corporation, Montecatini's wholly owned American subsidiary. Target date for completion has been set for within two years.

Indications in the announcement pointed to the plant obtaining hydrocarbon raw materials from the Leach plant of Ashland Oil and Refining Company, situated directly across the river.

Hooker Chemical Corporation announces expansion of two plants and construction of new facilities at another site.

Formalin production is slated to be increased 10 percent by the end of the year through installation of new equipment at the Durez Plastics Division, North Tonawanda, N. Y. And at the division's Kenton, Ohio, plant, facilities are being expanded to increase production of wood flour, made from wood chips and used as a filler for molding compounds. When work is completed, wood-flour capacity will be almost doubled.

Nearly $1 million has been earmarked for work at Jeffersonville, Ind., headquarters for the Phosphorus Division. Construction is under way on facilities whereby a new process will be used to make phosphates directly from ferrophosphorus. The other phase of this building program involves a new replacement phosphoric acid plant to supplement production of facilities at Columbia, Tenn., and Dallas, Texas. Completion of latter project is slated for this fall.

Mobay Chemical Company is building a plant in New Martinsville, W. Va., to manufacture polycarbonate plastic resins. Facilities are scheduled to be in production early next year.

Reichhold Chemicals, Inc. is moving rapidly ahead in its 1959 expansion program.

A $4-million maleic anhydride plant will be built by Badger Manufacturing Com-

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BULLETIN F-75 — Reverse Jet Dust Filter Facts. Complete with specifications, typical equipment layouts, capacity and performance tables for DAY type "AC" filter.

BULLETIN N-578 — Gives complete information about Style "A" rotary valves. Construction features, specifications, dimensions and applications.

"SCHLITZ DEFEATS DUST" — FOOD ENGINEERING magazine reprint describes all out dust control for 3½ million bushel Schlitz grain elevator. Request Bulletin "Schlitz Defeats Dust."

"EFFICIENT DUST SNATCHERS" — Bulletin describes DAY's part in providing maximum safety and good housekeeping for starch packing building of large food processor.

BULLETIN 510 — DAY Unit Dust Collectors. Complete, low cost unit designed for plants or applications where central dust control systems are not practical.

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Check 3715 opposite last page.

pany at Elizabeth, N. J. Capacity will be 20 million lb annually. Production is scheduled to begin next June.

A multi-million-dollar melamine plant which will have an initial capacity of 20 million lb a year will be built in the South. It is scheduled to go on stream early in 1961. Capacity eventually may be expanded to 50 million lb annually.

The company has purchased a 70-acre tract in Newark, Ohio, where a plant will be built to produce a full line of resins and chemicals.

Tennessee Eastman Company has under construction at Kingsport, Tenn., a multi-million-dollar addition to its Kodel polyester fiber production facilities. Production will be available about mid-1960. Completion of the unit will increase capacity of this material to more than 20 million lb annually.

Allied Chemical Corporation's National Aniline Division has announced it is expanding maleic anhydride production at its Moundsville, W. Va., and Buffalo plants. Work is expected to be completed in the last quarter this year.

Continental Carbon Company is spending in excess of $2 million on an expansion program at its Lake Charles, La., carbon black plant. Facility's annual capacity will be increased from 45 million lb to 70 million lb of high-abrasive black. Fish Engineering Company, Houston, was awarded the construction contract. Completion is expected by year's end.

American Cyanamid Company expects to have in operation early next year a plant to produce melamine crystal. It is being built adjacent to the company's molding compound facility and development laboratory at Wallingford, Conn. Initial capacity will be 10 million lb annually.

W. R. Grace & Co.'s Dewey and Almy Chemical Division has placed on stream a $4 million plant at Owensboro, Ky., to produce polyvinyl acetate polymers and copolymers,

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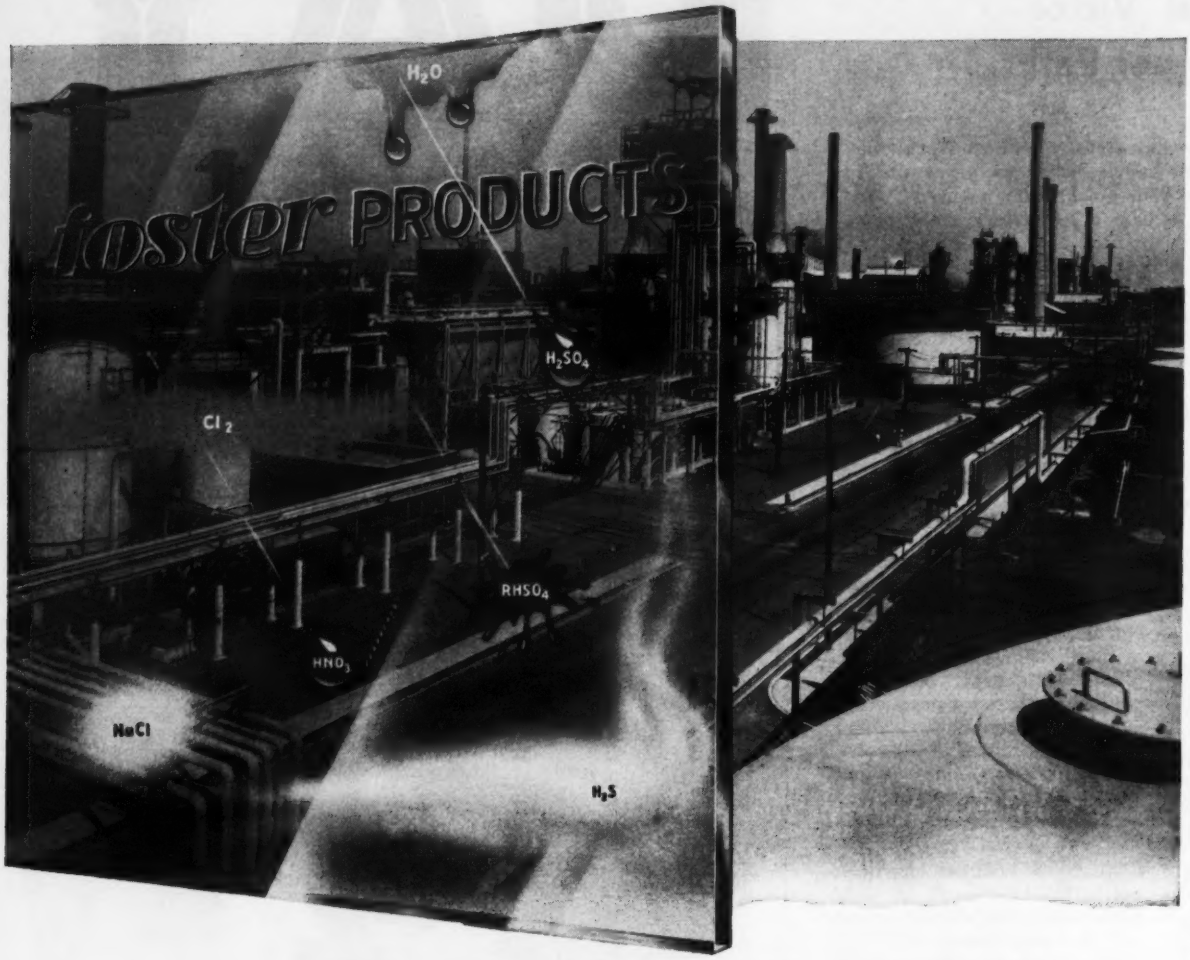

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butadiene-styrene synthetic rubber latices, and battery separators. Startup of the plant brings to 20 million lb annually the total latex and vinyl emulsion capacity at Owensboro, and increases by 30 percent the capacity for resin-impregnated fiber separators for the storage-battery industry.

Earlier, Grace and Hatco Chemical Company announced jointly an agreement had been reached under which Grace would acquire the business and assets of Hatco in exchange for 126,000 shares of Grace common stock. Hatco will be operated as a division of Grace.

Monsanto Chemical Company has completed expansion of silica production facilities at the Everett, Mass., plant. Operated by the Inorganic Chemicals Division, plant produces colloidal dispersions of silica in water and silica aerogels.

Diamond Alkali Company has placed in operation a 20 percent chlorine-caustic soda expansion at Deer Park, Texas, with initial operating rate set at more than 50 percent of capacity. With the new facility, aggregate capacity of the entire Deer Park Works is brought to 750 tons/day of chlorine, with a concurrent capacity of nearly 825 tons of caustic soda and 7.5 million cu ft of high-purity hydrogen.

American Chemical Corporation announces that the first of four completely integrated petrochemical units will go on stream early next year at Watson, Calif., as part of a $7.5-million investment in facilities. Three of the four units are being built by C. F. Braun and Company.

American, of which Richfield Oil Corporation and Stauffer Chemical Company are the parent firms, will manufacture ethyl chloride, ethylene dichloride, vinyl chloride monomer, and polyvinyl chloride resins. Richfield and Stauffer will provide basic raw materials for American's operation.

Armour and Company has announced formation of Armour Industrial Chemical

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Evidence of the outstanding efficiency and economy of this "National" drying unit is found in the number of existing and on-order installations among the Nation's leading chemical manufacturers.

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Check 3717 opposite last page.

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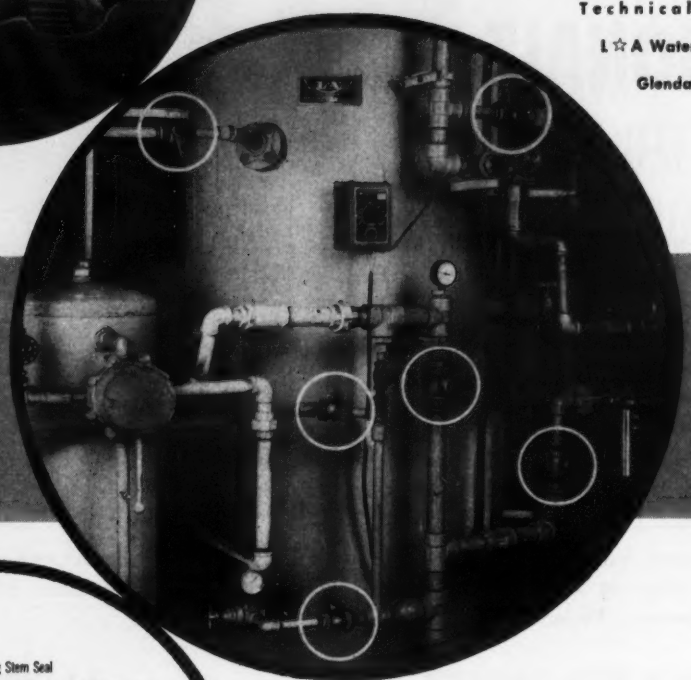
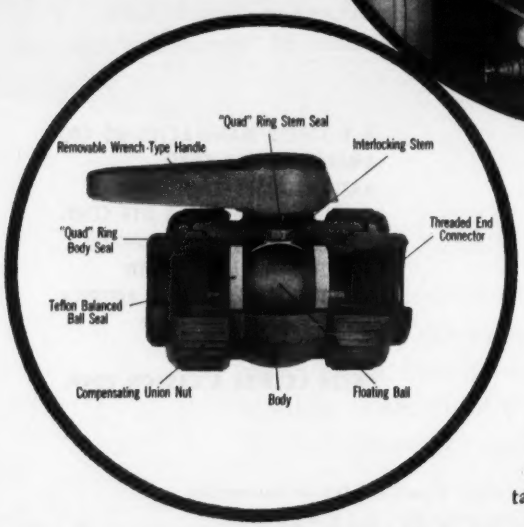
with **CHEMTROL** *Plastic Ball Valves!*

says Eugene Schmidt, Technical Director, L☆A Water Softener Co., Glendale, California.



CHEMTROL plastic ball valves, part of original equipment, on deionizing system at Pioneer Electronics, Los Angeles. Firm rebuilds TV picture tubes. Water purity is essential in preventing screen discoloration.



CHEMTROL PVC BALL VALVES used by L☆A Water Softener Co. are exposed to corrosive effects of sulfuric acid (10%), and caustic soda (4% to 50%). Pressures attain 125 psi. Quick disassembly allows speedy line service in event of obstructions.

OTHER FEATURES: handle indicates valve position from distance — positive shut-off with quarter-turn action. Teflon seats are adjustable, non-sticking. Ball construction assures long life, full flow, non-turbulence. Compact design permits easy adaptation to existing or proposed piping systems.

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*CHEMTROL manufactures plastic piping systems equipment for corrosion service. Our complete family of plastic valves includes BALL VALVES, CHECK VALVES, COCK VALVES, METERING NEEDLE and GLOBE VALVES, made from a wide range of plastic materials: PVC types I and II, Kralastic,** Polypropylene, and Penton.* If you are an engineer designing plastic piping systems, send for our new handbook #159.*

**Hercules Powder Co. **Naugatuck Chemical Co.*

Check 3718 opposite last page.

CHEMICAL BUSINESS

Company, a new grouping. It comprises the fatty-acids, fatty-nitrogen-derivatives, and ammonia divisions.

Foreign Plants

Columbian Carbon Company of the U. S. A. has under construction near Milan, Italy, a $6-million plant designed to supply 60 million lb of carbon black annually to the European Common Market. The facility, expected to be in operation early in 1961, will operate under the name of Columbian Carbon Europa.

Heyden Newport Chemical Corporation has formed a new company to produce gum rosin in Mexico. It is Resinera del Tigre, S. de R. L. deC. V., and is a collaboration of Heyden Newport and Resinera Uruapan, S. A.

Reichhold Chemicals, Inc. has formed a new firm to produce synthetic resins in Caracas, Venezuela. Named Resinas Venezolanas C. A., the company was established with a group of Venezuelan industrialists. Products will be made under formulas and techniques developed by Reichhold.

Continental Carbon Company is building a $2.6-million carbon black unit near Botlek, The Netherlands, which will have an initial capacity of 15,000 tons annually. Scheduled for completion next year, the plant will be operated by a Netherlands subsidiary, Continental Carbon Nederland, N. V.

Merck & Co., Inc. and the government of Thailand have reached an agreement under which Merck will be the first chemical and pharmaceutical company licensed to establish manufacturing facilities in Thailand.

A company to be known as Merck Sharp & Dohme (Thailand) will produce vitamins, diuretics, steroids, antibiotics, and other products from chemical intermediates. Construction of a plant already is under way near Bangkok, Thailand capital. Initial production has been scheduled for the first of next year.

nuclear notes

Significant news about atomic energy

Analytical chemistry confab scheduled at Oak Ridge

Oak Ridge National Laboratory has announced that the third conference on analytical chemistry in nuclear reactor technology will be held on October 26, 27, and 28, 1959, at Gatlinburg, Tenn. All communications relative to the conference, including submission of manuscripts and abstracts, should be directed to: C. D. Susano, Oak Ridge National Laboratory, P. O. Box Y, Oak Ridge, Tennessee.

Standby uranium plant to be disposed

AEC has decided to get rid of its uranium feed materials processing facilities located at Destrehan Street, St. Louis, Missouri. Plant has been on standby basis since July 1, 1958. Action is expected to result in savings of $250,000 annually, which is current cost of maintaining plant.

Radiation counter is only 6" long

Pencil-size counter is available for measuring distribution of neutron flux in critical assemblies. Unit has ½" diameter and is only 6" long. Device has approximate operating region of 900 volts; typical plateau length of 150 volts; and average plateau slope of 3% per 100 volts.

(BF-3 Counter is product of Radiation Counter Laboratories, Inc., Nucleonic Park, Skokie, Ill.)

Check 3719 opposite last page.

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TAPEnology develops all-purpose pipe sealant that rolls on dry!

Now, with new "SCOTCH" Brand Pipe Sealant Tape No. 547, you can stop fitting leaks quickly . . . easily . . . permanently! And, unlike conventional "pipe dopes", it rolls on dry; a single wrapping around the threads *does the job on any line.*

This new all-purpose sealant for your piping systems is chemically inert; withstands processing temperatures from the liquid oxygen range on up through super-heated steam; is not affected by traces of oil or other lubricants in the steam lines.

Tape No. 547 is easy to use, too! Handy roll size fits any pocket; can be applied anywhere; conforms tightly; any excess strips off easily to leave a neat, clean joint. What's more, it never dries out . . . permanently lubricated joints never stick; open with ease during line re-positioning.

Ask your nearest "SCOTCH" Brand Tape distributor for complete information, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. IAC-99.

When tape costs so little, why take less than "SCOTCH" Brand?

"SCOTCH" is a registered trademark for the pressure-sensitive adhesive tapes of 3M Co., St. Paul 6, Minn. Export: 99 Park Ave., New York 16. Canada: London, Ontario.

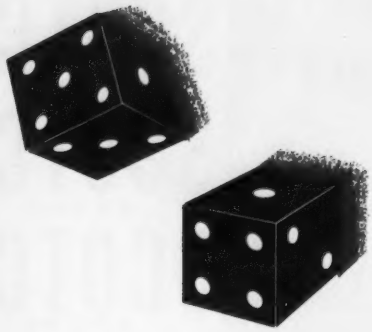
MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Check 3720 opposite last page.

don't gamble



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Why risk carrying high pressures in run-of-the-mill cylinders? For the same investment you can have the extra insurance of CYLINDER DESIGN proven by time and service. Harrisburg's design puts emphasis on both the cylinder's ability to contain high internal pressures, and to consistently withstand the shock and fatigue incurred during decades of rough handling.

Harrisburg's hot-drawing process permits the graduation of cylinder wall thickness to increase strength where it is needed most — at and around the cylinder base. And to insure positive gas-tight sealing, highly accurate ramp gauges are used to obtain precision neck threading on every cylinder.

Procedures such as these make Harrisburg cylinders the world's most dependable. Don't gamble. Buy quality. Buy Harrisburg.

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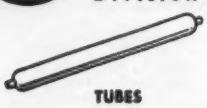
H HARRISBURG STEEL CO.

Division of HARSCO CORPORATION



TUBES

TRANSPORTS

FLANGES

COUPLINGS

Check 3721 opposite last page.

NUCLEAR NOTES

Cesium-137 in milk checked weekly

Los Alamos Scientific Laboratory is now in its fourth year of studying radioactivity from fallout in milk and in human beings. The research program provides important information by making weekly measurements of cesium-137, in people and in the milk supply of the U. S. and some foreign countries. Milk samples from 47 U. S. cities, 12 in Canada, and 13 in other countries are checked each week. Approximately 839 people were measured last year.

Milk samples are checked for radioactivity by means of large liquid scintillation detector

Cesium-137, like strontium-90, is a major constituent of distant fallout from nuclear explosions. Both fall to the earth in approximately same proportions and are absorbed in the human body through the food supply. Cesium distributes itself throughout body's muscle mass where it can damage reproductive organs. Strontium lodges in bone and can damage only cells in its immediate vicinity, making it almost incapable of producing genetic injury.

Radioactive clathrates made available

Tracerlab has announced the availability of radioactive clathrates, a new source of radiation which combines safety with high specific activity. The clathrate is a crystalline form of chemical hydroquinone combined with gaseous krypton-85. Specific activity is three curies per

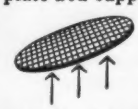
a filter man's thinking

"Expediency: when time is more precious than gold (or platinum)"

BY JULES P. KOVACS, V. P., PUROLATOR PRODUCTS, INC.

There's more than one way to skin a cat . . . or filter a chemical that fights any attempt to tame it.

As an example, here's a problem we recently licked in developing a diffusion plate bed support for a highly corrosive gaseous fluidized bed reactor, operating at very high temperatures. Pore size had to be 25 microns, able to support 20 psi. And it was needed in a *hurry*.



Now, anyone who knows filters could pick metals for such a job. The obviously ideal medium would be inconel. Trouble was, it was impossible to obtain a fine enough inconel screen. Of the only other metals that could withstand the corrosive action, gold lacked high temperature strength; platinum was too weak without support and too costly, though it did offer the high temperature strength and corrosion resistance needed. And that's where Purolator's special capabilities came into play.

Our engineers solved it by combining the finest mesh size of platinum available–150–with a fused facing of porous gold powder to reduce pore size to the specified 25 microns — and supported by inconel grids. Problem solved. Customer deadline met.

But the story doesn't end there. Purolator engineers immediately set about to find a way to take advantage of standard inconel mesh economy for similar applications. This is how we do it: inconel metallic edge type units are sliced in two, and two of equal thickness are punched out. One is rotated 90° from the other and fused by Purolator's exclusive process. By carefully controlling the amount of fusion material, we produce the exact pore size required. Simple?

It's *not* simple, of course. But it's typical of Purolator's complete service for special jobs. We live with challenges all the time. Want to read about some? Our brochure called "New Roles for Filtration" is just off the press and it will be interesting reading. Send for your copy.

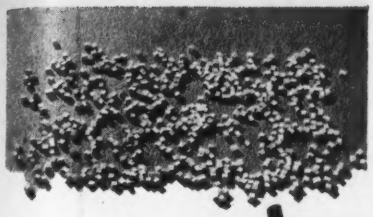
Filtration For Every Known Fluid

PUROLATOR

PRODUCTS, INC.

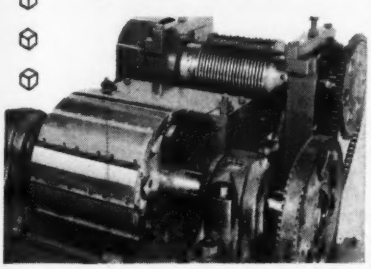
Rahway, New Jersey and Toronto, Ontario, Canada

Check 3722 opposite last page.



No Longs! No Fines!

When You Use a TAYLOR-STILES PELLETIZER



You cut evenly sized pellets like this — without longs or fines — at rates up to 20 tons an hour — with a Taylor-Stiles Pelletizer.

We make several different types of Pelletizers for sheet and rod stocks. One of these machines is certain to meet your needs as to plastic material to be cut, size and type of cut, hourly production, method of cutting, and other factors.

If you have any special need, we will be glad to work with you to develop the precise type of machine that will meet it.

Taylor-Stiles Pelletizers are used by most plastic material producers today — because of their unusual efficiency, high output, and the minimum of maintenance for both machine and *knives*.

For complete details regarding these machines, write today for 4-page illustrated technical bulletins #217, 216, 213, and 212.

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Check 3723 opposite last page.

gram, plus or minus 20%. Cost of one curie is $500.

(Further information about radioactive clathrates may be obtained from Tracerlab, 1601 Trapelo Rd., Waltham 54, Massachusetts.)

Check 3724 opposite last page.

AEC offers tritium at $2.00 per curie

In an attempt to stimulate broader civilian use of tritium, AEC has made available one million curies of the radioisotope. The material is offered to licensed users at $2.00 per curie, plus packaging and handling charges. Because supplies have heretofore been limited, tritium sales during the last 10 years have totaled only 51,998 curies.

Non-nuclear explosions planned by AEC

Marking a switch from its regular routine, the AEC is negotiating with Carey Salt Company for use of Company's mine near Winnfield, Louisiana, for detonation of several *non-nuclear* high explosive charges. Purpose of firings is to check seismic effects resulting from explosions. Activity is expected to involve about ten detonations ranging up to five tons high explosives.

Argonne breaks ground for huge atom smasher

Construction of a 12.5 billion electron volt particle accelerator has begun at Argonne National Laboratory near Lemont, Illinois. Known as the Zero Gradient Synchrotron (ZGS), the installation is expected to be completed early in 1962. Estimated cost is $29 million. Machine will have two basic purposes: 1) to serve as source of wide variety of sub-atomic particles, 2) as tool for investigating basic properties of these particles.

for GRINDING AND DEHYDRATION FINER PARTICLES LOW MAINTENANCE

FLUID ENERGY JET-O-MIZER MILLS

The Fluid Energy "Jet-O-Mizer" Mill, designed and built by the pioneers in fluid energy fine grinding, does far more than produce fine particles. It controls fineness and product quality with a narrow distribution range and simultaneously with grinding can dehydrate, coat particles, blend and achieve chemical changes.

Jet-O-Mizer Mills are being used all over the world, processing many types of materials in the following industries:

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• Insecticide	• Mineral	• Plastic	• Metal
• Ceramic	• Pharmaceutical	• Carbon	• Chemical

"*Jet-O-Mizing*" produces **FINE PARTICLES** ¼ micron average and above **PLUS** . . . Narrow Particle Distribution • Dry, or Controlled Moisture Content • Continuous Operation • Uniformity of End Product • Other Operations with Grinding • No Attritional Heat — No Moving Parts • Low Operating Costs • Low Maintenance

Send for complete information on Fluid Energy's "Jet-O-Mizer" Mills, "Jet-O-Clone" Dust Collectors, and TESTING AND CUSTOM GRINDING services.

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(Formerly known as the Wheeler-Stephanoff Mill)

Check 3725 opposite last page.

ECO ENGINEERING NEWS

VOL. 1, NO. 4

the big name in small pumps for the process industries

Pumping Notes

World-Wide Demand

ECO pumps are being sold in 47 different countries, outside of the "Iron Curtain."

Interesting examples are 316 Stainless Steel ECO GEARCHEM® Pumps with TEFLON† trim for handling ethylene dichloride and nitroglycerine, ordered by Nitroglycerine Aktiebolaget, Gyttorp, Sweden—the business founded by Alfred Nobel of the world famous Nobel Peace Award.

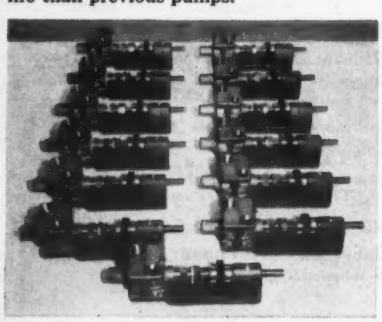
Also—a recent order for 14 ECO ALL-CHEM® Carpenter-20 Stainless Pumps from India, for Atomic Energy applications.

And another application of ALL-CHEM Pumps by Aktiebolaget Bofors of the 2nd World War Bofors Gun fame.

ECO Export Sales are under the direction of Mr. Joseph Rizzo, Empire State Building, New York, N.Y., U.S.A.

ECO Midgets Serve Green Giant

Thirteen ECO ALL-CHEM 316-Stainless Steel Pumps with Neoprene impellers, carbon bearings and chemically impervious TEFLON Packings are helping to pack Green Giant Corn, Peas and other delectable vegetables at Le Sueur, Minnesota. These little pumps handle seasoning and preservatives. They offer positive non-contamination of taste, aroma, color and purity of product; provide greater dependability and much longer service life than previous pumps.



New GEAR-VAC Valve*

This new engineering development of ECO Engineering Company is expressly designed to energize flows of highly viscous (up to 250,000 SSU) media and to dispense them with positive metering accuracy in volumes up to 2 gpm. To accomplish this, the GEAR-VAC Valve produces almost absolute vacuum, causing the viscous mass to collapse into the vacuum pocket, providing a constant supply in the gear chamber for positive dispensing with reproducible metering accuracy within ± 2 percent.

Revolutionary Advantages

The ECO GEAR-VAC Valve offers a novel and distinct contribution to process equipment technology.

It eliminates the need for heating such viscous media before passing through the valve as is the case with cumbersome plug valves. It also eliminates sluggish and time-consuming gravity feed of such media.

Linear, Bubble-Free Flows

Flows are linear, bubble-free and can be accurately varied at will—as contrasted with the performance of plug valves which, when used to control flow, yield greatly reduced, lumpy and spasmodic flows. ECO GEAR-VAC Valves, instead of restricting passage of media, develop reduced flows by correspondingly reducing the RPM of the gear mechanism. Also, when used to dispense highly viscous, adhesive or cohesive media, there is no leakage past the gear train. Hence it performs like any plug, check or shut-off valve in positively stopping flow of media.

Manual or Motor Operated

ECO GEAR-VAC Valves are offered with handwheel for manual operation (where the amount dispensed may be determined by the handwheel travel), and motor-operated with pulley, sprocket wheel or flexible shaft drive, for remote or process-controlled operation on constant or cyclic flows.

Simplicity of Design

This unit represents features of design which offer rapid and complete accessibility to bearings and gear train. It regularly features standard 150 lb. ASME 3 in. flange on suction side for connection to tank, reactor, etc. Tapered conical suction port design offers minimum resistance to sluggish media. Threaded discharge port is ¾".

ECO Products for Handling Corrosive and Hazardous Processing Fluids

ALL-CHEM Rotary Pumps	**CENTRI-CHEM Centrifugal Pumps**
MINILAB Rotary Pumps	**PUMPMOBILE Portable Pumping Units**
GEARCHEM Gear Pumps	**CHEMICAL FAUCETS Factory Mutual Approved**

Ask for literature on any or all of these ECO Products

*Trademark applied for †duPont Trademark

For more information on product at left, specify 3726 see information request blank opposite last page.

A CHEMICAL BUSINESS PROFILE

FOR THE MANAGEMENT TEAM

SEPTEMBER 1959

CHEMICAL PROCESSING

FMC's CHEMICAL DIVISIONS . . . .

. . . a Case Study of . . .

GROWTH FROM WITHIN

JOHN MELLECKER
Editor East

ONLY a few years ago, FMC's Chemical Divisions made up a loosely held combine of five individually acquired and operated chemical companies. The combined total sales volume at time of acquisition amounted to about $40 million.

In 1958 these same Divisions reported $135.6 million in gross sales — largest in FMC's history.

Such prodigious growth has not "just happened."

It is the result of infusion of the acquired companies with new capital, and where required, new management assistance. Perhaps most important — a carefully planned and executed program of consolidation and integration.

Being fortunate in its choice of acquisitions was only the first stage in achieving the present outstanding level of corporate "success." What has been done with these acquisitions makes an outstanding case example of the workings of a modern, process-oriented, chemical-company management.

The effects of such integration — with a company — are never totally revealed by dollar signs. People — or human relations — both bring about integration and are affected by it. As one of the several young, top executives now seen around FMC Chemical Divisions' New York headquarters puts it, "Learning how really to work *with* people of different objectives in the same company has a synergistic effect — the result is greater than the mere sum of the individuals' contributions."

Shows the Way

How did the Chemical Divisions' integration from within get under way? It turns out that one man has had a vast influence and responsibility with respect to seeing, guiding, and stimulating others onward through this important period in recent company history. He is a former college professor and wartime government official, who since 1956 has held the top executive post in FMC's Chemical Divisions.

When Carl Frederick Prutton gave up full-time teaching (he will insist he has never really given it up altogether) and went into private industry as Mathieson Chemical's director of research, many thought he was taking a bull by the tail. Mathieson was known to be gearing up for bigger and better operations. When, however, only one year later, Prutton was made Mathieson vice-presi-

FMC's Chemical Divisions Executive Committee meets. Left to right: Bernard Jacobson, Alfred T. Loeffler, Jackson V. Vernon, Carl Prutton, Wm. N. Williams, Frederick A. Gilbert, Emil Ott

FMC's Chemical Divisions

From preceding page

dent and director of operations, engineering, *and* research, here was evidence that a most unusually capable man had emerged into a top role in the chemical industry.

It was FMC's good fortune when, in 1954, Paul Davies, its president (now chairman and chief executive officer) and Ernest Hart, then executive vice president (now president) persuaded Carl Prutton to take on what was to evolve into an even larger role. Starting out as FMC vice president and technical director of the Chemical Divisions, Prutton soon began a comprehensive study of company operations. In a short time he was father confessor to process engineer, plant operator and executive — all alike in one way, that Carl Prutton could talk their language. A commonplace, innocuous sounding question asked by Prutton at all levels was, "How do you *know* you're doing as well as you can?"

"The startling thing that happened after a few of such conversations with Carl," reveals Fred Gilbert, who at the time was assistant head of Becco, "was that many thinking people found they couldn't get out of their minds the all-too-pat answers they gave Carl's question. Soon they were digging to find out what they *really* knew about their operations, and then looked forward to another meeting with Carl to tell him what they had figured out."

"Up and down the organization," continues Gilbert, "people began giving really objective thought to how their operations affect other people's operations in the company setup." So began the preparations for integration.

Prutton's Plan

In just 18 short months, Prutton was made executive vice president of FMC's Chemical Divisions, with Ernest Hart moving up to the presidency. Now, Prutton's searching analysis reached higher into all management activities and problems. It was not long before things began to happen. Research, being carried on in nine separate FMC establishments, was consolidated down to four. One of these was a new Central Research Laboratory in Princeton, N. J., for which construction was started in 1955. Research consolidation was undertaken by the former director of Hercules' research, Dr. Emil Ott, who joined Prutton's team that same year.

By late 1957, Prutton's key people were anxiously awaiting the development of an over-all plan for consolidation of other of the Divisions' activities. "One day along about November of 1957, the old Operating Committee — the forerunner of the present Executive Committee — passed a resolution that such a plan for reorganization and integration should be developed as soon as possible," recalls Bill Williams, now a corporate vice president and then head of Westvaco Mineral Products. "At this point Carl Prutton started talking about a few ideas he had on the subject. Carl is one of the most persuasive salesmen to management one would ever hope to have. In what seemed like no time at all, Carl outlined a sweeping organization plan which was later adopted."

On April 2nd, 1958, the Prutton plan for reorganization and consolidation went into effect. "The main difficulties we ran into," comments former administration head Al Loeffler, now vice president in charge of the Organic Chemicals Department, "had to do with getting people to think in terms of big ideas about what a well-equipped company with lots of resources can do."

Due to modernization and reorganization it was possible to logically reduce the personnel in the entire Chemical Divisions by 8-9%, wherever feasible through early retirement or other equitable arrangements.

Emphasis at every level, up and down the line, was at this time directed toward efficiency of operation and most effective utilization of the human resources of the organization. Much duplication of effort or duty was eliminated. Jobs were re-evaluated on the basis of: *What should this individual be able to handle?* — which, incidentally, is another question Carl Prutton has instilled in his organization by constant repetition.

Created: The Management Team

Major outgrowth of the April 1958 reorganization was the creation of a small, flexible, and comparatively youthful top management team. This team — known as the Chemical Divisions Executive Committee — runs these Divisions. This committee includes, besides Dr. Prutton as Chairman, the heads of three "staff" departments and two of "line" category. In the staff group are vice presidents Dr. Emil Ott representing Central R & D (which includes patents), Jackson V. Vernon of Marketing and Distribution (which includes traffic, purchasing and industrial, public, and trade relations), and Wm. N. Williams of Manufacturing and Engineering (Central Engineering, Process and Mineral Development and Law Department).

Jack Vernon and Bill Williams, corporation vice presidents, now handle for the executive vice president major administrative matters and projects, and supply the broad commercial background needed in the over-all management of the Chemical Divisions. Bernard Jacobson, a Corporation director and vice president (formerly head of the old Ohio-Apex Division) also renders invaluable aid in top-level deliberations of the Executive Committee. The "line" members are vice presidents Frederick A. Gilbert as head of the Inorganic Department, and Alfred T. Loeffler as head of the Organic Department.

Probably the most significant step in the reorganization and consolidation was the setting up of the two broad product categories, or "Departments." *Inorganic* was formed out of Becco (hydrogen peroxide), Westvaco Chlor-Alkali (as its name implies), and Westvaco Mineral Products (chemicals based on phosphorus, barium and magnesium).

Organic on the other hand, was formed by pairing off the Niagara division (primarily a manufacturer of pesticides and herbicides) with the Chemicals & Plastics Division which in turn was formed by uniting Fairfield (ex-USI pilot-scale facility at Baltimore) with Ohio-Apex, a plasticizer and resin manufacturing facility at Nitro, West Virginia.

Cooperative Services

Soon each division began to feel, in various ways, additional real effects of reorganization and integration. For example, a single R & D group was set up for each Department, focusing primary attention on product development and applications.

Inorganic's R & D started developing applications know-how about — for example — the textile industry's use of and needs for phosphates (Mineral Products Division), hydrogen peroxide (Becco), and caustic soda (Chlor-Alkali Division), hydrogen peroxide (Becco) and caustic soda (Chlor-Alkali Division). A new wing of the Princeton Central R & D Laboratory is now under construction, largely for Inorganic's use. All "line" R & D functions are being set up on an industry basis, and amply staffed with industry specialists who will be concerned mainly with product application research.

The Organic Department likewise has its own R & D function, for the same reasons. The specialized nature of that Department's operations warrant separate applications research and customer-service facilities. At Middleport, New York, is a pesticide-testing facility which screens compounds of potential interest for their effectiveness. The

Baltimore facility (under Organic's Chemicals and Plastic Division) consists of a number of semiworks units intended originally for pesticide and specialty chemicals small-lot manufacture.

Today, Baltimore is sometimes operated as a semiworks service facility for both Departments, in making samples for marketing ventures, and to permit process-engineering studies. It also includes a complete technical applications laboratory for plastics development.

Where research efforts are common to the interests of both Inorganic and Organic Departments, then Central R & D undertakes the job—sometimes doing the actual work and at other times merely coordinating the efforts of others.

Vital to the new organizational setup is the marked differentiation that exists in the functions of the "line" and "staff" departments. Central Research, for example, undertakes only projects of pertinence to the corporation. The same is true of central engineering, and process and mineral development. The closest these staff functions come to direct contact with the "corresponding line" groups is through review and appraisal functions and the making of suggestions.

Another function important to FMC Chemical Divisions' record of success has been the thoroughness with which the needed basic raw-material resources have been secured by prudent acquisition through purchase or lease of mining properties so as to make the Divisions completely self-sustaining. Derived from earliest Westvaco policy, FMC's Chemical Divisions have aggressively continued their exploration and development of such resources as trona, phosphatic shale, salt, and barytes.

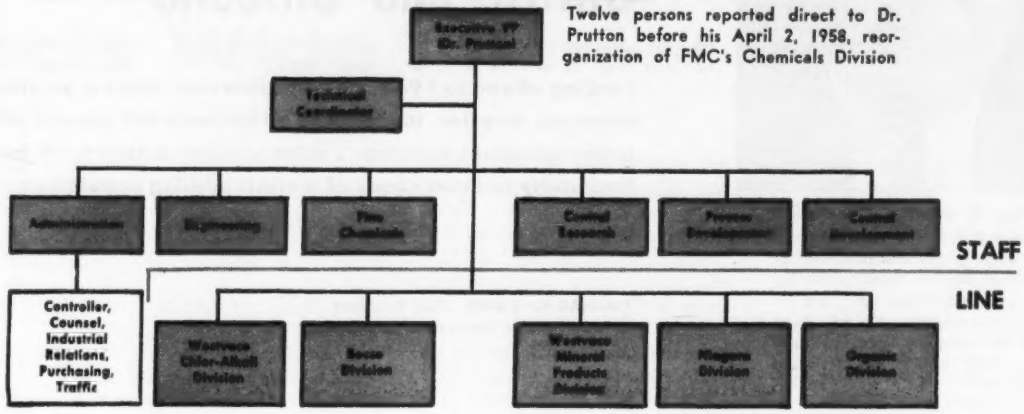
Perhaps one of the best examples of the FMC Chemical Divisions strides towards modernization and profitability is seen in the rehabilita-

To page 195

How Carl Prutton Reorganized FMC Chemical Divisions

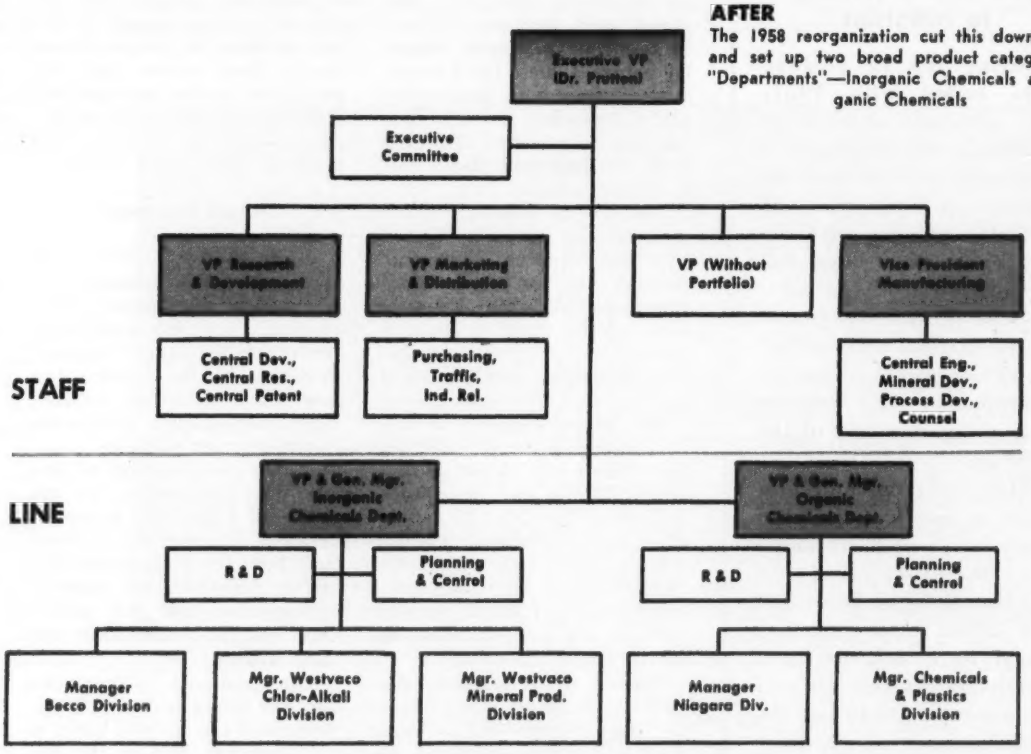
BEFORE

Twelve persons reported direct to Dr. Prutton before his April 2, 1958, reorganization of FMC's Chemicals Division



AFTER

The 1958 reorganization cut this down to five and set up two broad product categories or "Departments"—Inorganic Chemicals and Organic Chemicals



Thomas C. Davis is a vice president of E. I. du Pont de Nemours & Company. He also is a member of the Board of Directors, the Executive Committee, and The Finance Committee. He has been with the company since 1934, and from 1948 to 1953 has served as treasurer

Depreciation and Tax Policy Unwise and Unsound

Looking ahead to 1967, depreciation may cause a possible economic disaster. Inadequate allowances and chronic inflation pose major questions in author's mind whether industry will be able financially to meet needs of a mushrooming population

THOMAS C. DAVIS, Vice President
E. I. du Pont de Nemours & Company

$76 Billion Tribute to Inflation

During the 12 postwar years ended with 1957, U.S. industrial enterprises spent some $244 billion for plant capacity, and modernization and replacement of obsolete and worn out facilities. This huge sum was necessary to provide services and products required by population increase of 30 million persons and to accommodate the demand of a rising standard of living.

This expenditure and industry's quick expansion obscure a tragic economic fact: Due to the erosion of inflation these facilities cost $76 billion more than they would have cost in 1946 dollars. In 12 years it cost 45 percent more to buy the same amount of capacity.

—Thomas C. Davis

EVERY day I evaluate the nation's financial health for the month ahead, the year ahead, and sometimes think in terms of a decade ahead. By nature, I guess I'm a pessimist—I wear both suspenders and a belt—but my concern, happily, is not for 1959. It's 1967 I'm disturbed about, and for three reasons.

The first is inflation, which is a deadly erosion of our purchasing power. It is proceeding at an apparently steady average rate of 2 percent a year. And, as far as I can see, it will continue unless something heroic is done to stop it.

My second concern relates to population growth and the new needs and demands that some 200 million Americans will have by 1967. To satisfy this future demand without lowering living standards, the nation's Gross National Product must rise from its present annual rate of $460 billion or so to nearly $700 billion.

The third worrisome element in this look at the future is the ability—or, perhaps, lack of ability—of U. S. industry to provide productive facilities fast enough to satisfy new and enlarged appetites.

Frankly, the prospects are somewhat dim. I don't know if American industry will be able to provide enough modern facilities to supply these needs. One reason for my pessimism is the fact that industry must operate in an inflation economy under an unrealistic depreciation policy.

Federal Reluctance

In spite of this, there is a continuing unwillingness on the part of the Treasury Department and the accounting profession to support suitable revisions of the income tax law which would permit sufficient depreciation allowances for income tax purposes.

It may seem strange to single out depreciation as the cause of a possible economic disaster. But there is a direct and intimate relationship between inflation and national depreciation and tax policy. And it's time something was done about it.

Our national depreciation and tax policy is unsound, unwise, and can do real harm to the economy and to the nation. When our plants wear out we must have the money available to replace them. If we don't, we're in trouble. And the best way to avoid this pitfall is for industry to replace its equipment without the added and unfair tax burden it now endures.

There are, however, two obstacles to a realistic depreciation policy.

One is the public accounting profession which, with exceptions, holds rigidly to an accounting concept of ancient vintage. They claim that the original cost of the object is the sole consideration in depreciation—not its cost of replacement.

The second obstacle is the income tax law which contains this same rule.

Cites Decline in Dollar

This rule may have been reasonable before World War II, when the dollar that bought plant and equipment was worth approximately a dollar. But today that dollar is worth 41c. In 1967—at inflation's present pace—it will be worth only 35c. And, by then, there is hardly an industrial plant now in operation that will not need considerable overhauling, if not replacing.

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As part of his recent seven-week swing through the chemical industry in Europe, CP Editor John Vaaler attended the Conference Internationale des Arts Chimiques and 5th Salon International de la Chimie in Paris, France. Here is his report on highlights of his visit there.

Fifth Salon de la Chimie Attracts Wide Interest

The Conference Internationale des Arts Chimiques and 5th Salon International de la Chimie, meeting in Paris, France, in June, emphasized again the importance of the chemical processing industries in world affairs.

Twenty-five nations were represented by sales agents and manufacturers in the colorful exhibits. This year 1360 exhibitors took part—largest in the history of the Salon.

Conference covered a broad range of subjects, and interest in the program was high. Corrosion, plastics and rubber, chemical engineering, instrumentation and control, laboratory techniques, organic chemistry, and other general topics were included.

Conference Program

The program had been arranged to keep topics of common interest within a day or two of the entire program. Thus a person with interests only in chemical engineering programs could attend for two days of the 10-day meeting and cover those programs.

Papers on research were similarly arranged, as well as the other categories in the conference.

Although no exact count of each registrant was kept, the total number of visits is expected to total 200,000. (If it is assumed that each visitor entered the exhibit hall five times during the 10-day show, a total of 40,000 would have attended.)

Exhibit

The exhibition hall was housed in a modern-design, four-year-old group of buildings. Within were 1360 exhibitors from 25 countries. A total space of 600,000 square feet was used. Effective area of the exhibit space was 300,000 square feet. This contrasts with the first Salon in 1951, in which the area was 1/10 this amount, and shows the high degree of interest in this field.

It is estimated that over $10 million worth of equipment and materials was shown. Of the 1360 exhibitors, 100 were classified as chemical manufacturers. Chemicals, specialties, rubber and plastics, etc. are included in this classification.

The well-planned exhibit building permitted management to set up a unique and well-ordered exhibit layout. All of which made it easy for a visitor to examine products of his primary interest. Together in separate sections were such categories as:

1) Chemical materials
2) Natural and synthetic rubber, plastics, and plastics-fabricating equipment
3) Laboratory and instrumentation equipment
4) a. Processing equipment
   b. Corrosion control
5) Heat-generating and heat-transfer equipment.

Visitors were impressed by

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Taking a break in front of 5th Salon de la Chimie exposition hall are (left to right) CP Editor Vaaler; M. A. Vauglin, Salon de la Chimie Director; and Professor Dr. Kurt Fischbeck

CONTINUOUSLY CONTROLS CONCENTRATION TO LESS THAN 1% AVERAGE DEVIATION

System consisting of automatic viscometer, variable speed motor for operation of pump, and various controls enables plant to produce microcrystalline wax of uniformly high quality

JOSEPH PHILLIPS & B. R. BLUESTEIN
L. Sonneborn Sons, Inc., Daughtery Refinery Div.
Petrolia, Pa.
with **CP Staff**

Problem: L. Sonneborn Sons, Inc. required better control in the concentration of reactants for the continuous manufacture of microcrystalline wax.

At the plant, crude petrolatum stock is dissolved in a hydrocarbon solvent. Solution is then chilled and centrifuged to separate wax from the oil phase. The concentration of petrolatum in the solvent largely determines the properties and yields of resultant waxes.

Because of ever-growing demands for waxes of high quality in a variety of tailor-made grades, it is not only desirable but compelling to be able to change stocks speedily and accurately.

In the original plant, the throughput rate was 200 gpm, but concentrations could only be checked at four hour intervals. Even then if a change had to be made, a further period was involved for adjusting the variable speed pump which controlled grease-solvent ratio. As a result, large quantities of the blend were frequently processed at concentrations which were far from optimum.

Furthermore, a number of factors whose actual significance varied from time to time tended to cause deviations in the concentrations of the deoiling solution. These factors included the height of material in the stock and solvent tower as well as the height of solution in the storage tank; variations in the temperature of the solvent and of the deoiling stock and variations in the capacity of the pumps also added to these deviations. It was virtually impossible to maintain desired concentration short of installing a laboratory at the mixing pumps and determining concentration at short intervals.

Solution: The answer to this problem was to install a method which would automatically determine concentration at very short intervals and also make required corrections automatically.

In order to do this, a study was made to find what physical properties of the components in solution could be used to determine concentration. The petrolatum stock that is used is a dark hydrocarbon mixture having a viscosity at 210°F ranging from 14 to 23 centistokes and specific gravity of 0.81 to 0.83 at 180°F. The solvent used consists of colorless hydrocarbons having a viscosity at 100°F of about 0.8 centistokes and a specific gravity of 0.745 at 60°F.

Since viscosities of the components are very dissimilar and since the viscosity of the blend varies exponentially with concentration, this property seemed to offer the best point of attack. Blends of various concentrations of different stocks of petrolatum in solvent were prepared and their viscosities were determined at 150°F by means of a Fenske-Cannon viscometer. From these results a table was prepared for the conversion of viscosity to concentration.

A survey was made of different methods available for measurement and control of viscosity. To meet requirements, a method had to have three prerequisites:

1—It had to be capable of determining the concentration of blends with very low viscosity—in the range of 1 to 2 centistokes at 150°F.

2—It had to be sensitive enough to determine differences in viscosity of 0.02 centistokes—equivalent to the difference of 0.5% in absolute concentration.

3—It had to be able to record viscosity data and utilize these data to control the concentration of grease in solution automatically.

A viscometer which measured viscosity by means of a falling plunger appeared to have all of these prerequisites and was chosen for the system. It is used along with variable speed motor-driven pumps and other controllers as follows:

Process

Solvent is pumped from the solvent tank via a heat exchanger using a constant speed pump. Petrolatum is pumped from the stock tank via a heat exchanger by means of a variable-speed motor driven pump into the solvent line at the suction side of the solvent pump.

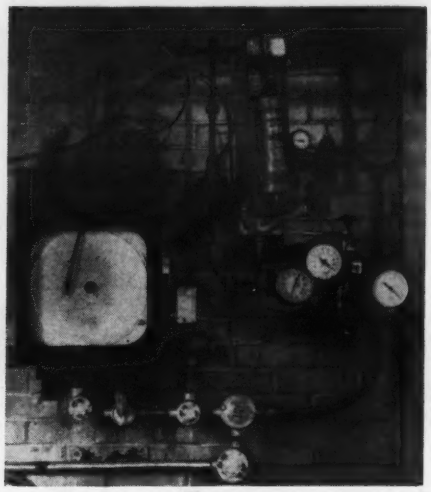
This motor varies its speed directly with the pressure of air fed to it by a Metagraphic Controller. The blend is then pumped through a mixing head to the solution storage tank. As the blend leaves the mixing head, a small sample is continuously withdrawn for viscosity measurement.

A diagram of the viscosity recording and controlling instruments is shown in an accompanying diagram. The sample passes through a water precooling chamber and a thermostatically controlled oil bath and then into the viscometer test chamber (0.3 gallon capacity). The oil bath is maintained at a constant temperature by circulating the heating oil via a pump. The sample continuously overflows into a small tank equipped with a level control. This, in turn, activates an electric pump of 5 gpm capacity to return the sample to the main blend line.

Size may be varied according to the viscosity range of the material being controlled. In the Sonneborn process, all of the blends can be measured and controlled very satisfactorily by a single plunger. Viscosity of the sample is determined once every minute and is automatically recorded on a chart.

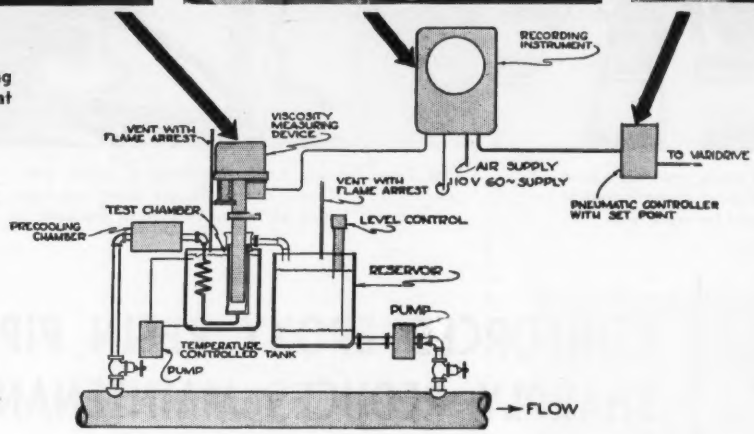
Viscometer and sampler

Viscometer recorder is at left. Electric signal from viscometer is converted by pneumatic controller (right) into air pressure which is used to control variable speed motor via Varitrol unit



Pneumatic controller for variable speed motor

Diagram of viscosity recording and controlling instruments at Sonneborn



Since the viscometer recorder, which is not explosion-proof, is located in a room considered to be an explosion-hazard area, pure air is continuously passed into the recorder box to prevent the potentially explosive air of the room from entering the box. Air failure causes an immediate shut-off of electric power and immobilizes all electrical equipment in the room.

Furthermore, the recording instrument box is wired in such a manner that opening its door (to change charts, refill inkwell, etc.) breaks the electric circuit by means of a switch connected to the door.

The electric signal from the viscometer is converted by a pneumatic controller into air pressure which is used to control the Varidrive Motor via a Pneumatic Varitrol. The latter varies the speed of the pump directly with the air pressure. If the controller is out of adjustment, an air line which by-passes it is used to operate the Varitrol manually.

The following factors were found to have an influence on the effectiveness of this operation:

1—In order to avoid "cycling" the sampler should be small enough and the viscometer close enough to the main line in order to minimize the lag in concentrations of the blend in the main line and in the sampler. The sampler used has a capacity of only 0.3 gallon. By sampling at the rate of 0.5 gallon per minute, the lag is less than one minute.

2—The temperature of the sample should be as constant as possible, although a maximum variation of 2°F is acceptable. This allows precision within 0.3-0.4% absolute concentration. If the temperature of the main blend could be rigidly maintained and turbulent flow avoided, it would be preferable to determine the viscosity there rather than in a by-pass. By doing this, the lag is practically zero.

3—The air should be carefully filtered, since even a small concentration of impurities has a cumulatively deleterious effect on the controller.

Results: With present automatic controls, an average deviation of less than 1% in absolute concentration of petrolatum solution from the desired has been obtained over long periods of time.

The time lag between concentration determination has been shortened from four hours to one minute. Any corrective adjustment can be made quickly. Samples are still checked in the laboratory at four-hour intervals to insure that the automatic equipment is operating correctly.

Automatic measurement and control of concentration has helped Sonneborn produce high-quality microcrystalline wax. It is now easier to tailor the product according to customer requirements.

(Viscometer is product of Norcross Corporation, Newton 58, Mass.)

Check 3727 opposite last page.

(Pneumatic Controller and Metagraphic Controller are products of The Bristol Company, Waterbury 20, Conn.)

Check 3728 opposite last page.

(Varidrive Motor, with Pneumatic Varitrol Controller, is product of U.S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif.)

Check 3729 opposite last page.

(Electric pump is product of The Haight Co., 2308 W. Vliet St., Milwaukee 5, Wis.)

Check 3730 opposite last page.

Acknowledgement: The authors wish to express their thanks to Mr. A. Kinsel for his valuable assistance in this work.

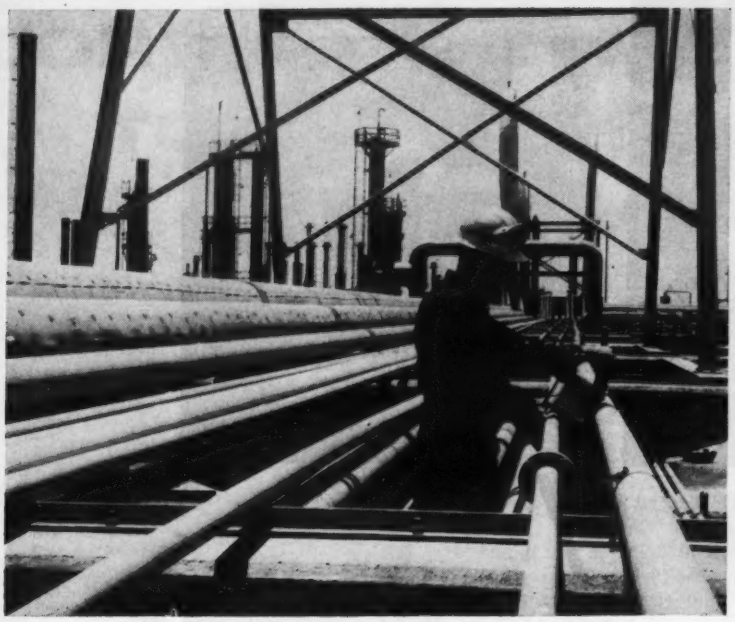


Fig 1 — Painting a section of 3000' of 3" reinforced epoxy resin pipe used to transfer 32% HCl at Shell Chemical. Pipe has sufficient strength that it can be installed on pipe racks with spans normally used for metal pipe

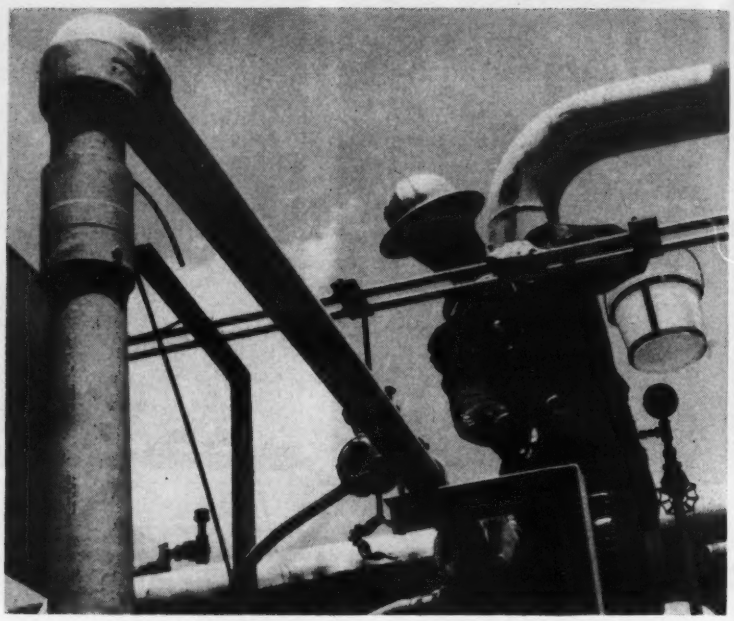


Fig 2 — Painting brackets holding 2" epoxy pipe used for handling hypochlorous acid. Elbows, collars, flanges shown are made of the reinforced epoxy pipe which can be used at pressures to 1000 psi

Satisfactorily handling highly corrosive acids at temperatures to over 200°F and helping to preserve the purity of other products, about 5000 feet of —

REINFORCED EPOXY RESIN PIPE SHARPLY REDUCES MAINTENANCE COSTS

GORDON WEYERMULLER
Associate Editor

At Shell Chemical Corporation, Houston, Texas, epoxy resin pipe reinforced with glass fibers is being successfully used in a number of different services involving corrosives. Pipe, called Fibercast, has slashed maintenance costs and been an important factor in maintaining the purity of petroleum chemicals being manufactured. About 5000 feet of pipe is used in the plant.

Installations

In one area, 3000' of 3"-diameter reinforced pipe carries 32% hydrochloric acid at ambient temperature (Fig 1). This piping was installed in 1958. It replaced two other types of corrosion-resistant piping. Installation has sharply decreased maintenance costs on this line.

Another section of 3" epoxy resin pipe, 1400' long, handles 99% allyl chloride containing a trace of hydrochloric acid at ambient temperature. This line, which was installed in 1958, replaced steel piping which had affected the purity of allyl chloride. No maintenance has been required.

In another area (Fig 2) 200' of 2" epoxy pipe carries chlorine water (hypochlorous acid) at ambient temperature. It took the place of hose which had to be replaced every two years. After two years' service, the plastic pipe is still in excellent condition. It has required no maintenance.

Another section of reinforced pipe, 2" in diameter and 130' long, carries liquid epoxy resin. This line was installed in 1957. Had the reinforced plastic not been used for the line, stainless steel would have been required in order to maintain the high purity of product.

A 25' long section of 2" epoxy pipe handles water containing glycerine and miscellaneous polymers at 150°F. It was installed in 1958. No maintenance has been required.

Another section of 2" reinforced pipe, 130' long, carries a vaporous mixture of hydrogen chloride, Bisphenol-A, phenol, and steam at temperatures above 200°F. It was installed in 1958, supplanting steel piping which had to be replaced every few months. Only one spool of the epoxy pipe has been replaced in over a year of service.

In area where synthetic alcohol is made, 2" and 3" epoxy pipe carries 85% phosphoric acid at ambient temp (Fig 3, p. 40). This 30' line, installed in 1957, replaced a line made of a corrosion-resistant alloy.

Fibercast Pipe

Pipe is made by bringing woven glass fibers and epoxy resin together in a high-speed centrifugal casting machine. It is produced in lengths of about 20', with or without threads. Pipe up to 3½" OD is made with multiple layers of seamless braid. Pipe 4½" OD is

To page 40

Over-heat protection for power-house bearings has reduced cooling-water consumption, increased oil life, and redirected manpower as . . .

Thermistor Bearing Monitors Produce $40,000/Year Bonus

Problem: A double inadequacy existed in hand-feeling system of checking for overheating of bearings in two power houses and a river-water-pumping station of National Aniline Division of Allied Chemical Corporation in Buffalo, New York.

The faults: 1) Continuous round-the-clock protection was not provided. 2) By the time a three- to five-inch-thick bearing housing became abnormally hot to touch, bearing was generally beyond repair.

Bearings requiring checking are in forced and induced-draft fans, boiler-feed pumps, and feed-water-transfer pumps associated with five large-capacity steam boilers. Also needing monitoring are bearings in four river-water pumps which handle up to 20 million gpd of cooling water.

Solution: An over-heat detection system was set up to provide continuous monitoring of bearing temperatures.

Temperature monitors are 84 probes (with thermistor detecting elements in tips). Each is in contact with a single bearing. Every detector is set to actuate visual and audible alarm if temperature of its bearing rises 30°F above normal summer operating temperature.

Lead from each probe is connected to amplifier unit which is 40 to 75' away. Amplifiers of probes for given piece of equipment are all connected across single power relay.

Receipt of over-temperature signal from a probe by any amplifier in group actuates relay to operate warning light for that unit of equipment. Horn signal, tied in with building's annunciator system, is sounded at same time.

All warning lights are installed on firing floors, which are always manned. Lights for each set of forced- and induced-draft fans are located on control panel of associated boiler. Similarly, warning lights for feed-water and transfer pumps are placed on corresponding control panels.

Annunciator silencing switch is provided on panels for each alarm circuit. System of overhead lights operates in conjunction with warning lights to indicate area of plant where alarm condition must be corrected.

Results: Since thermistor probes are in direct contact with bearings, abnormally high temperatures can be detected before serious trouble

To page 38

Two warning lights, above operator's hand on this boiler control panel, flash on to indicate abnormally high temperatures in a bearing of forced-draft fan (left light) or induced-draft fan (right light). Operator is touching annunciator silencing switches

PROBE INSTALLATION

Thermistor probes (shown here monitoring two bearings of one river-water pump) are constructed of stainless steel.

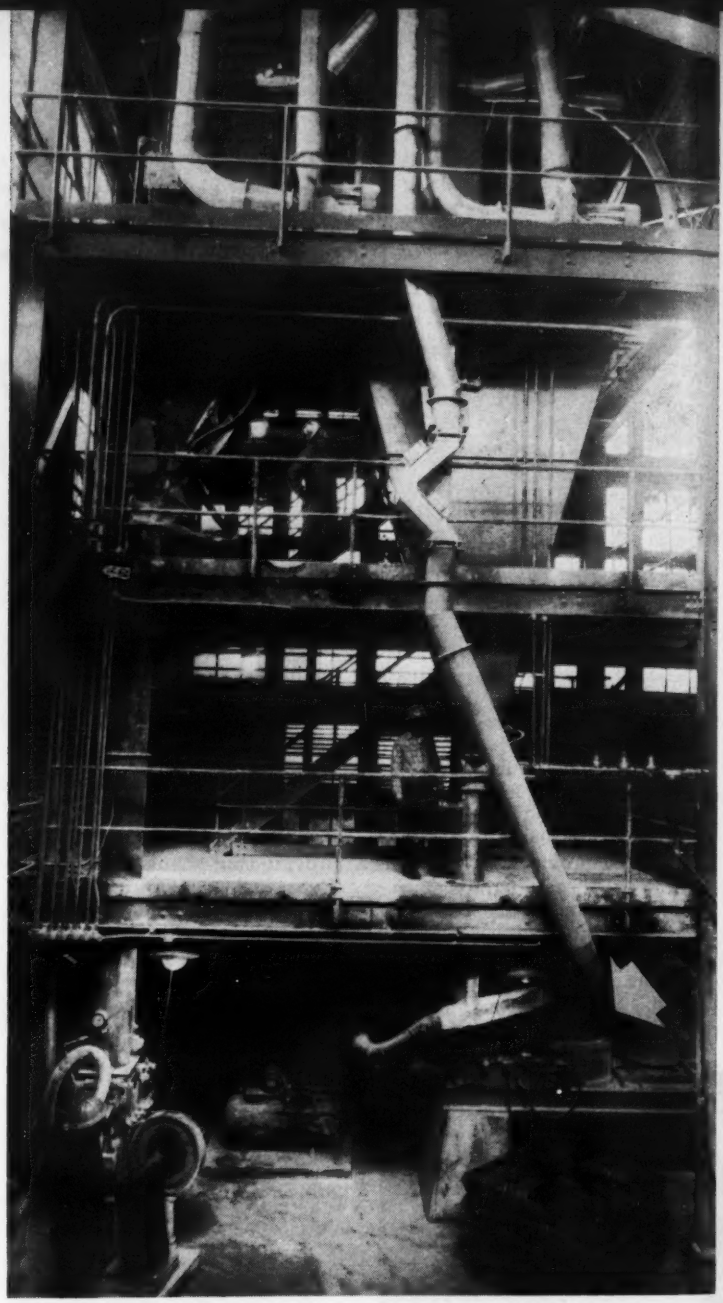
Six-inch long probes are used regardless of housing thicknesses. Length of probe does not affect response since thermistor detecting element is located at tip.

Each 3/16" detector is installed by means of compression-type fitting in hole drilled in bearing housing. Mounting hole is drilled to sufficient depth so that tip of probe rests against outer race of ball bearings or babbitt backing of sleeve bearing.

Tightening of mesh specifications on DPG rubber accelerator meant extra screening of product in American Cyanamid's production facilities at Linden, New Jersey. Now, a vertical hammer mill with built-in air classification . . .

produces proper PARTICLE SIZE without additional SCREENING

THEODORE W. WETT, Associate Editor
with **A. R. MAHNKEN,** Product Supervisor Rubber Chemicals
American Cyanamid Co., Linden, N. J.



Pulverizer (arrow) helps American Cyanamid meet "tight" specs on DPG particle size

PROBLEM: Existing pulverizing equipment was inadequate to meet tightened mesh specifications on diphenyl guanidine (DPG) at American Cyanamid Company's Linden, New Jersey plant. Extra screening required on this white, crystalline, rubber accelerator was a continuing source of additional cost and involved equipment requiring considerable maintenance.

A complete analysis of the overall grinding and packaging system disclosed a number of other weak points. Chain-link conveyors required frequent repair. Auger-type packing equipment did not always maintain desired accuracy. Dust collectors, operating on positive air pressure, tended to allow very fine particles of DPG to sift into the atmosphere. At times, conditions became quite dusty.

Solution: Management at American Cyanamid decided to modernize the entire line. Chain-link conveyor, dust collector, screens, and packing equipment were all replaced in August 1958.

Material flow now proceeds as follows: Dried pellets of DPG feed from dryers, through a rotary air lock, into pneumatic conveying system. Conveyor delivers material to first surge hopper. An Orlon-bag dust collector cleans exiting air.

Pellets pass from surge hopper through rotary air lock to a vertical pulverizer with built-in air classifier. Pulverized material is then carried by pneumatic conveyor to finished-products surge hopper. Air from this hopper is also passed through an Orlon-bag dust collector. Product is fed from hopper through rotary air lock to bag packer.

Equipment Detail

Dust collectors have no internal moving parts. They consist of a series of cylindrical filter elements (Orlon bags) enclosed in a dust-tight housing. Dust-laden air is admitted to the housing and clean air is withdrawn from inside filter elements.

Cleaning is accomplished by process of aerodynamic valving. A jet of high-pressure air is momentarily introduced through a specially contoured venturi mounted above each filter cylinder. This primary high-pressure air pumps additional secondary air via the jet pump process, thus producing a reverse flow sufficient to clean filter cylinders. Since only a small portion of the total filter area is cleaned at one time, continuous flow through the collector is maintained.

Jets are controlled by solenoid valves, actuated by an electrical timer. Timer is adjustable, so that the cleaning cycle can be varied to meet load conditions. Filter area is 210 sq ft (30 tubes 4½" in diameter, 6' long); capacity is 2100-3100 cfm; air requirements at 100 psig are 4-5 scfm.

Pulverizer is a vertical hammer mill with built-in air classifier designed to produce an intermediate fine grind at high capacity. Design capacity is 2000 lb/hr.

Unground material is air conveyed into grinding chamber. An upward blast of air sweeps particles to separator where fines are vented. Fan producing this circulation, as well as providing air-conveying energy, is located on clean side of dust collector. Oversized particles that reach the

separator wheel automatically drop back to the hammers for regrinding. Hammers in two upper rows are specially contoured to aid this recirculation.

Unit is driven by a 40-hp motor connected by a V-belt drive. It is 75" high. Motor and pulverizer are mounted on a 74¾"-long base which occupies an area of approximately 35 sq ft.

Results: Pulverizer produces material which meets desired specifications consistently (99.9% through 100 mesh). This unit also provides better particle-size distribution than could formerly be obtained. No additional screening is necessary.

Pneumatic conveyor, operating under a slightly negative pressure, has eliminated dusting and repair and maintenance costs formerly incurred with mechanical unit. Dust collector, with no internal moving parts, requires a minimum of maintenance and also helps reduce dusting.

Entire installation has been so successful that production has been increasing every month since completion.

(Pneumatic conveyor, Mikro-Pulsaire dust collectors and Mikro-BuD pulverizer were supplied by Pulverizing Machinery Div., Metals Disintegrating Co., Inc., Summit, New Jersey.)

Check 3731 opposite last page.

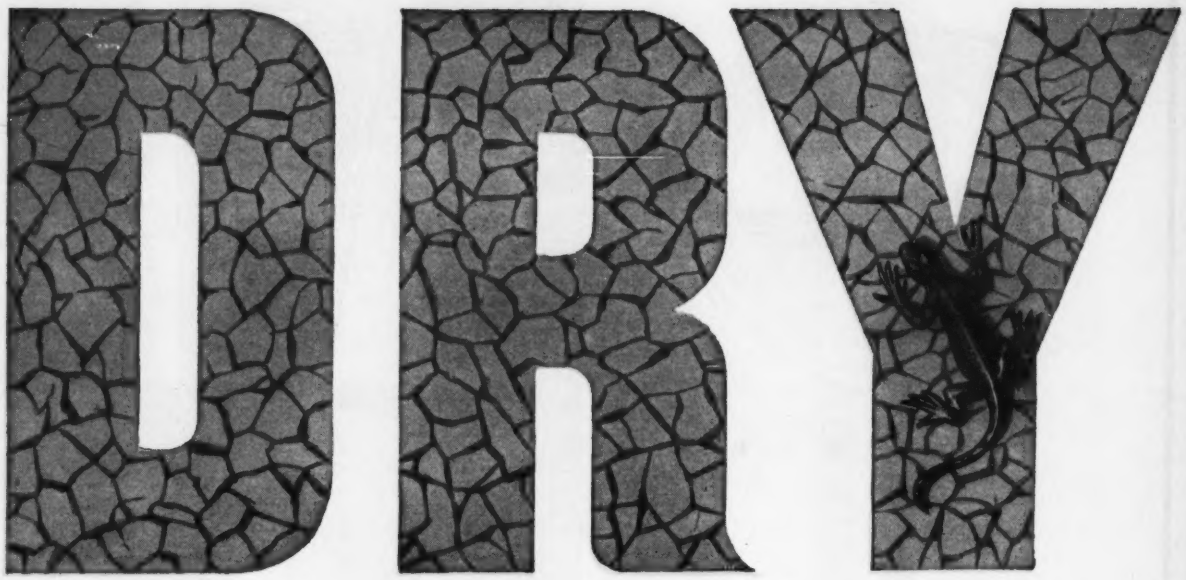
How to cut costs of waste disposal is theme of 12-page booklet. Unit described operates automatically, grinds refuse, renders it odorless, and discharges it to haul-away containers. Case histories and installation photographs are included. SOMAT Waste Disposal System — Wandel Machine Company, Pomeroy, Pa.

Check 3732 opposite last page.

NEXT MONTH

Converting byproduct sulfite liquor from paper mills into useful products continues to gain momentum. One of the biggest spray dryers in the business is now operating in Canada. Get the details in this section next month.

If it must stay



specify super-adsorptive Davison Silica Gel

One cubic inch of Davison Silica Gel has an adsorptive surface of 90,000 square feet—an area larger than two city blocks. This capacity has made Davison Silica Gel the favored desiccants for air and gas dehydration wherever rust, corrosion, mildew or other moisture problems exist. For instance, Davison desiccants are used to protect tropical shipments, to clean and dehydrate air and natural gas—refrigeration systems—blast furnace gases—and in oxygen plants. Perhaps the application of a Davison desiccant to *your* moisture problems is in order. Write Dept. 3729 or call today for complete information.

DEPARTMENT 3729

W.R. GRACE & CO.

DAVISON CHEMICAL DIVISION

BALTIMORE 3, MARYLAND

Check 3733 opposite last page.

WHICH VALVE IS OPEN?

They both are . . . but only the Hydromatics ***FLO•BALL 715***, on the right, shows its position at a glance! A fast **quarter** turn moves it from open to closed position—instant action at flow pressures up to 3,000 psi with just 4 inch-pound torque. The ***FLO•BALL's*** exclusive straight-thru design has 100% flow efficiency—more than double the flow of needle valves!

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Write today for a complete catalog describing this valve and others for corrosive and cryogenic media. Also special designs for throttling flow control.

The *FLO•BALL* costs no more than old fashioned screw-type valves!

Hydromatics, Inc.

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Exceptional engineering employment opportunities—write today!

Check 3734 opposite last page.

NEW SOLUTIONS

Bearing Monitor Bonus

From page 35

develops. Case in point: One detector picked up overload on an induced-draft fan by means of detection of bearing over-heating. At this time bearing trouble had not yet developed.

In addition to providing continuous round-the-clock bearing over-heat protection, system's use has produced three-way cost-savings bonus. Reduction in cooling-water consumption, increased lubricating-oil life, and lessened manpower costs are expected to save company approximately $40,000/year. (System has been in operation for about eight months.)

In setting up detection network, it was necessary to determine actual operating temperature of each bearing. Portable-pyrometer check revealed that many bearings were actually running too cool.

Resulting reduction of water consumption in such instances, and elimination of need for general preventive over-cooling previously necessary, have reduced over-all cooling-water-consumption rate by roughly 20%. It is also anticipated that closer adherence to proper operating temperatures will prolong bearing life.

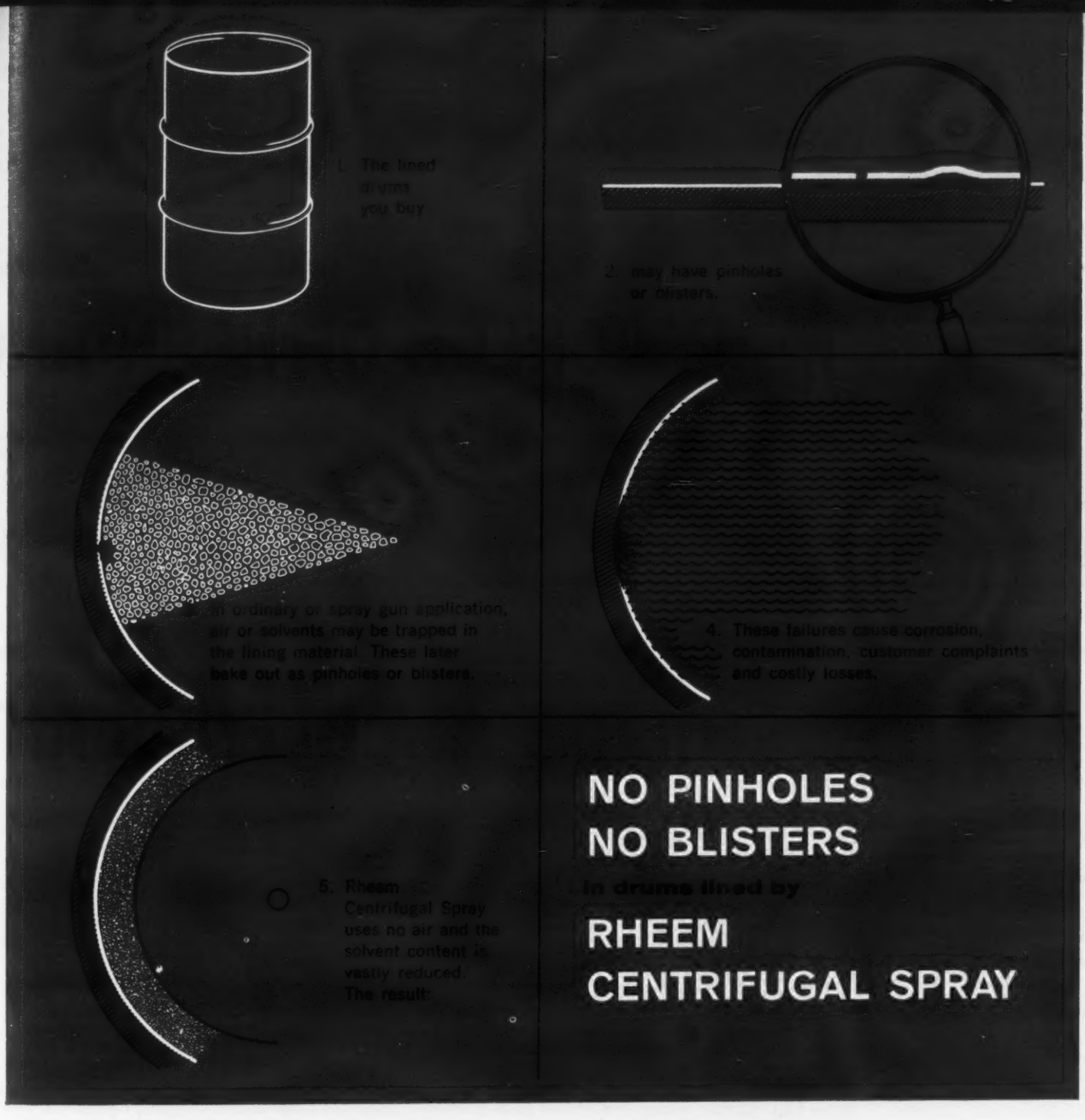
At higher operating temperatures less condensate is formed in gear-box lubrication systems. This has doubled life of lubricating oil, to provide second savings factor.

Finally, personnel formerly utilized to check bearing temperatures by feel are now assigned to other duties not chargeable to power-plant costs.

(Over-heat detection system was developed by Fenwal Incorporated, Ashland, Mass.)

Check 3735 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.


1. The lined drums you buy
2. may have pinholes or blisters.
3. In ordinary or spray gun application, air or solvents may be trapped in the lining material. These later bake out as pinholes or blisters.
4. These failures cause corrosion, contamination, customer complaints and costly losses.
5. Rheem Centrifugal Spray uses no air and the solvent content is vastly reduced. The result:
NO PINHOLES
NO BLISTERS
in drums lined by
RHEEM
CENTRIFUGAL SPRAY

And that's not all. For more than three years, Rheem Centrifugal Spray has been delivering lined drums free of thin spots and globs or skips. Air turbulence is eliminated. Human error is eliminated. Lining thickness is controlled to within 1/10 of a mil. Linings are cured by unique Rheem Vertical Curing in three stage, high temperature ovens. For more information, or help in developing a lining for a problem product, write the world's largest manufacturer of steel shipping containers at 1701 West Edgar Road, Linden, New Jersey. Plants across the country . . . Chicago, Houston, Linden, New Orleans, Richmond, Calif.; South Gate, Calif.; Tacoma. For other sales offices see the Yellow Pages.

Rheem

Check 3736 opposite last page.

Reinforced Pipe

From page 34

made with specially designed glass cloth in convolute layers.

Although the reinforced piping is subject to only moderate pressures at Shell Chemical, it can withstand pressures as high as 1000 psi and temperatures to 300°F.

Pipe has a smooth interior with a Hazen-Williams C factor of 147. This minimizes

Fig 3 — Installing a gate valve in a 2" reinforced epoxy line carrying 85% phosphoric acid. Fittings made of the reinforced plastic can be used with standard metal items such as this valve

friction losses, facilitating flow. Pipe is less than ¼ the weight of steel. It has essentially the same linear coefficient of expansion as steel. It is a nonconductor and is not subject to cold flow.

(Fibercast reinforced epoxy pipe is product of Fibercast Company, Div. of Youngstown Sheet & Tube Co., PO Box 727, Sand Springs, Okla.)

Check 3737 opposite last page.

(Epon® resin used in manufacture of pipe is product of Shell Chemical Corporation, 50 West 50th St., New York, New York.)

Check 3738 opposite last page.

Two germanium rectifiers aid U-235 separation in atomic plant

Two 480-KVA germanium rectifiers are being used to supply DC power in preparation of feed compound, utilized in large-scale separation or concentration of uranium 235.

At gaseous-diffusion plant in Portsmouth, Ohio, fluorine

IN PRODUCTION QUANTITIES. A new centrifugal force Liquid-Solids blender has evolved from P-K's exclusive "Twin-Shell" design. It blends never-before-practical combinations of liquids and solids! It reduces conventional blending operations to a single step!

For new combinations of liquids and solids, this amazing blender offers untold advantages. Applications are limited only by imagination. They range from chemical reactions to coating very light solids such as cork, to producing all types of controlled granulations from fine to coarse.

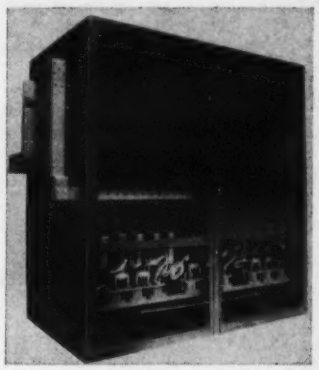
In conventional applications, the one-step P-K Liquid-Solids blender often eliminates two and three separate stages of blending, pulverizing and screening. It replaces a multiplicity of equipment. It reduces equipment investment and materials handling costs.

P-K Liquid-Solids units blend up to 40% liquids by weight. Blending requires minutes, not hours. It involves four simple actions: 1) Dry Solids are charged to about 65% of shell volume. 2) Solids are tumbled and aerated to break up agglomerates. 3) Atomized liquid is dispersed through patented centrifugal force spray discs. 4) Product is discharged from the bottom of the blender.

All surfaces of the blender are freely accessible. The

gas is generated by passage of DC, supplied by germanium rectifiers, rated at 6000 amps, 60v, each. Operating efficiency of germanium junction is approximately 95%.

In conditioning fluorine-generating cells, approximately 4000 amps at 11v DC, is passed through for 15 to 30 seconds. Voltage is then raised to 55v, polarizing the generating cell. In operation, two cells are connected in series. Rectifier output is adjusted for approximately 6000 amps at 20v DC.



Germanium rectifiers are housed individually in cubicles

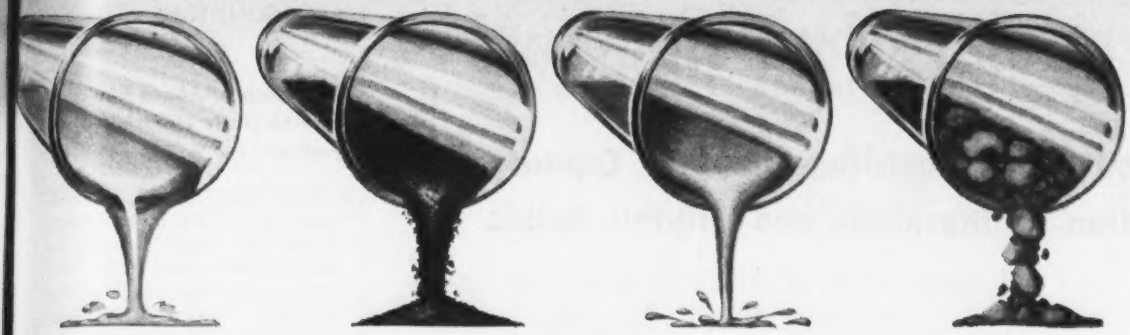
Control of rectifiers is accomplished by means of saturable reactor. They are individually housed in cubicles measuring 84 x 76 x 45".

Fluorine gas is compounded with uranium to form uranium hexafluoride. Separation process, involving several thousand stages, utilizes uranium hexafluoride gas for diffusion through porous barriers containing billions of minute holes. These allow portion of gas to be enriched in U-235.

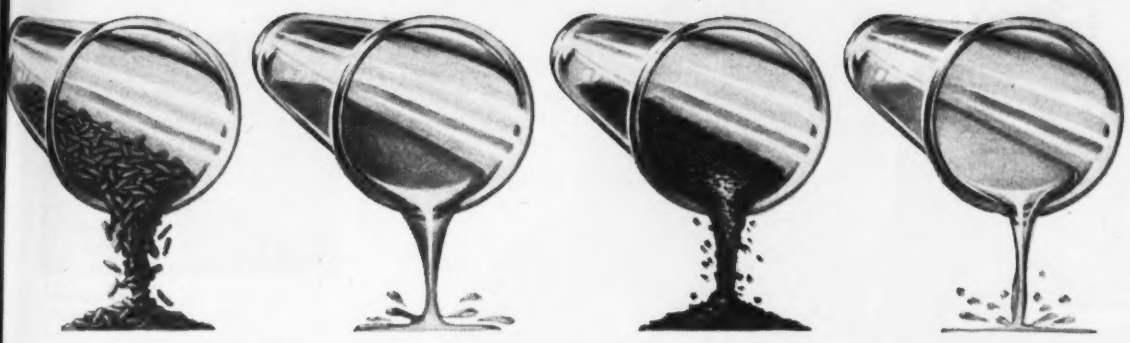
After each stage, enriched product becomes further concentrated. Impoverished portion is recycled through next lowest stage. Total volume of gas recycled is over 1,000,000 times volume of enriched gas. In passing through such stages, U-235 is gradually separated or concentrated.

(Germanium rectifiers are product of Rapid Electric Company, 2881 Middletown Rd., Bronx 61, N.Y.)

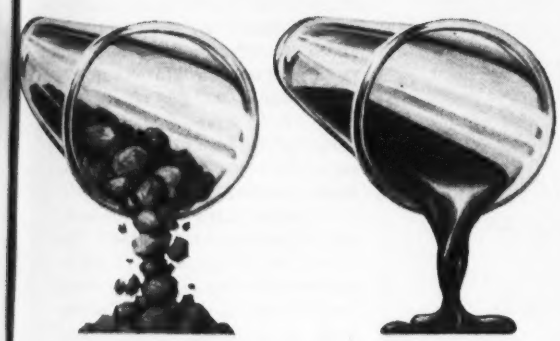
Check 3740 opposite last page.

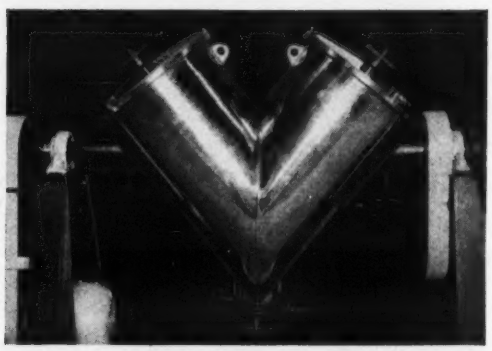


POSSIBILITIES



LIQUID WITH ANY SOLID!





Liquid-Feed bar is easily removed. These features speed cleaning and safeguard against contamination. Sizes range from laboratory models to 50 cu. ft. capacity.

FREE PRE-TEST OFFER. You can preview blending economies at our Laboratory. Pre-testing predicts savings in processing and handling and realistically demonstrates the unique performance of this blender.

Our pre-test facilities for blenders – and also for P-K Vacuum Tumble Dryers – are at your disposal. Send or bring your test materials. For complete information call (Stroudsburg – Hamilton 1-7500) or write George Sweitzer at our East Stroudsburg Headquarters, 1809 Hanson Street. 15

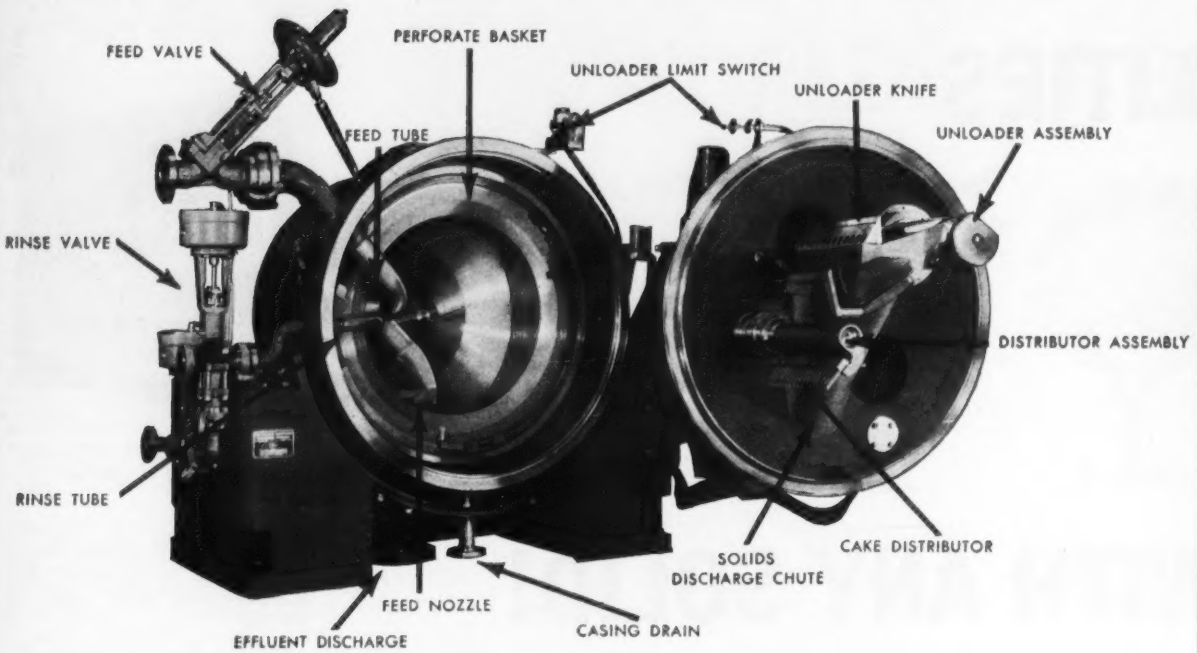
Patterson Kelley

Chemical and Process Equipment Division, East Stroudsburg, Pennsylvania

Check 3739 opposite last page.

SHARPLES C-41 SUPER-D-HYDRATOR

The Advanced Design Centrifuge for High Capacity Deliquefication of Inorganic and Organic Solids



The C-41 is designed to load and unload the solids as quickly as process requirements permit; power requirements do not limit the capacity of this centrifuge.

To accomplish this end, a very special kind of ruggedness is built into the centrifuge—a quick acting ruggedness that makes it possible to load a crystal cake of 300 to 400 pounds at 1250 rpm in 6 to 12 seconds; and to unload the same 300-400 pound cake into the discharge chute in less than one and one half seconds!

Among other features, the C-41 offers flexibility of "chemical treatment" rinses so essential for extra high purity and dryness as required for example, by the polyolefins.

All the details in Bulletin 1286 just off the press.
Ask your local Sharples Office, or write direct.

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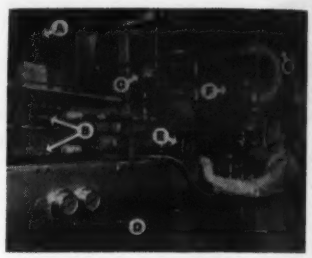
Check 3741 opposite last page.

Rejection of photo films due to static electricity reduced by 95%

Problem: Grant Photo Products, Inc., of Lakewood, Ohio, found that rapid winding of photographic material in a dry room created sparks generated by static electricity, which ruined film and caused fire hazard. Also, dry air made material curl, thus hampering winding operations.

Winding chamber used in operation is 25′ long x 8′ wide x 10′ high. Freshly coated and dried material, hung on chain-driven wooden racks, enters chamber after passing through drying chamber 175′ long.



In preheater and tank humidifier unit, air from winding chamber is drawn by fan located in intake duct (A) through preheater (B) and into tank humidifier (D). It then passes through filters into exhaust duct (G) and back into conditioning chamber

Humidity range of 55 to 99% RH and temperature range of 80 to 120°F is necessary due to variety of materials handled.

Solution: Light-proof winding chamber was rebuilt by Grant to incorporate combination preheater and tank humidifier unit. Conditioning unit is located immediately outside chamber. Dimensions are 8 x 2 x 6′.

Air is pulled at 1500 cfm from winding chamber by fan located in intake duct (A) into preheater (B). Self-operating regulator (C) maintains constant temperature of air passing from preheater into humidifier tank (D).

Air then passes through tank, picking up moisture from evaporating water maintained (by float mechanism) at one-foot level at tank bottom. Temperature of water is

kept at average of 100°F, depending upon material in chamber.

Additional moisture is provided by mist, created by 100 nozzles on eight vertical pipes in four banks within tank. Water pump (E) forces water at 30 psi from bottom of tank up through mist nozzles. Second self-operating regulator (F) maintains water within tank at constant temperature.

After picking up moisture, air passes through exhaust duct (G) and into conditioning chamber. It is then recirculated.

Self-operating regulator (C) is completely self-contained. It requires no outside power source. Mechanism comprises thermal bulb filled with volatile fluid. It is connected by flexible capillary to diaphragm bellows which operates valve on steam line.

Bulb is placed in water at bottom of tank through side jacket. Any temperature change in water varies pressure fluid in bulb. Such change is transmitted through capillary to diaphragm bellows. This operates valve gradually to control steam flow, normally averaging 20 psi.

Second regulator (F) is placed on steam line supplying coils in heater. Thermal bulb is placed in air duct between preheater and humidifier to maintain air temperature going into humidifier.

Results: System has succeeded in producing 95% reduction in number of rejects due to static electricity. Curling has been eliminated. Relative humidity has been kept within ±1% and temperature with ±1°F.

(Preheater and tank humidifier was constructed by Grant utilizing No. 11 regulators, which are product of Powers Regulator Company, 3434 Oakton St., Skokie, Ill.)

Check 3742 opposite last page.

Radioisotopes' applications to various industrial measuring problems are expanded upon in four-page Measurement Problems Brochure — Radiation Counter Laboratories, Inc., 5121 W. Grove Avenue, Skokie, Ill.

Check 3743 opposite last page.

You can find a bigger price... but not a better coupling

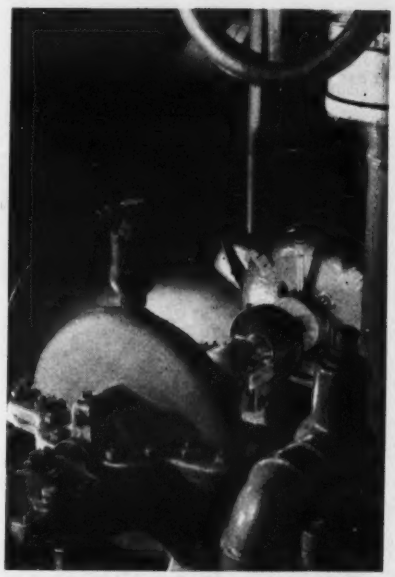
LINK-BELT MOTOR COUPLINGS are priced low among high-quality flexible couplings

Here's your best value in the flexible coupling field . . . an ideal, low-cost answer for such motor-driven equipment as pumps, compressors, speed reducers and generators.

Besides substantial first savings, you realize the economies of fast, easy assembly and servicing. Allen head, spiral cam fasteners, which open and close with only a quarter turn, are a permanent part of the cover . . . no loose nuts or bolts.

There's economy in performance too. Geared design assures high capacity and durability . . . torque transmitting parts are accurately machined from cold-rolled steel. Especially important, compensation for both angular and parallel misalignment is FREE—i.e., without imposing loads on shafts and bearings.

Link-Belt Motor Couplings are immediately available off-the-shelf for shafts up to 2½".



NEW!

CORROSIVE-DUTY COVER

This new cover provides positive protection for Link-Belt Motor Couplings against damaging effects of corrosive attack. Construction includes stainless steel fasteners, polyester fiber seals.

FOLDER 2875 has complete information. For your copy, write your nearest Link-Belt office or authorized stock-carrying distributor.

LINK-BELT

GEARED FLEXIBLE COUPLINGS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 10,159

Check 3744 opposite last page.

For SPEED, SIZE, SAVINGS and SAFETY

FLETCHER SUPER CENTRIFUGALS

SOLVE YOUR PROBLEMS

Call on Fletcher to solve your toughest problems in centrifugal engineering.

For example, this super-suspended centrifugal—the Fletcher Super-S-Omatic broke through the speed barrier. Until it was developed, no centrifugal of this size existed that achieved 1600 RPM = 1750 G's.

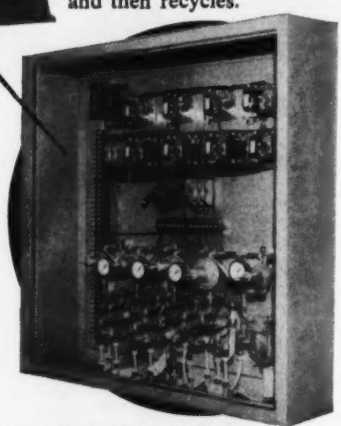
This Fletcher centrifugal, with a gravity of 1750 G's, is coupled with a production rate of 16 cubic feet per batch. This unit is capable of 6 production cycles per hour.

The Fletcher Super-S-Omatic features infinite variable speed by fluid mechanical drive. It's *completely* automatic—at the touch of a button it automatically starts, feeds, skims, brakes, unloads and then recycles.

FLETCHER ELECTRO-NUMATIC BRAIN

Eliminates all possibility of human error. Assures perfect performance. Completely safety interlocked. Cuts labor costs 100%.

Regardless of how intricate the schedule of centrifugation, the Fletcher Electro-Numatic Brain thinks it through *all the way.*



FLETCHER PILOT PLANT CENTRIFUGAL

Rugged, compact machine combines functions of extractor, separator and clarifier. Results from this test unit can be accurately scaled up to production unit.

WHEN in Philadelphia Visit The Fletcher Operating Centrifugal Exhibition.

ASK ABOUT THE FLETCHER RENTAL PLAN

The New Fletcher Works, Inc. CENTRIFUGAL DIVISION

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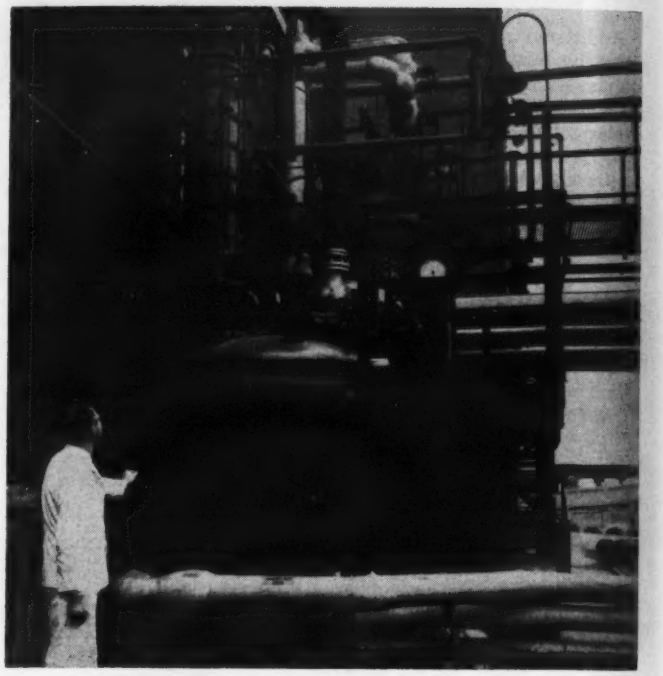
Check 3745 opposite last page.

NEW SOLUTIONS
of processing problems



CP Staff Photo

Graphite condenser mounted above reactor at the Indianapolis plant of Eli Lilly

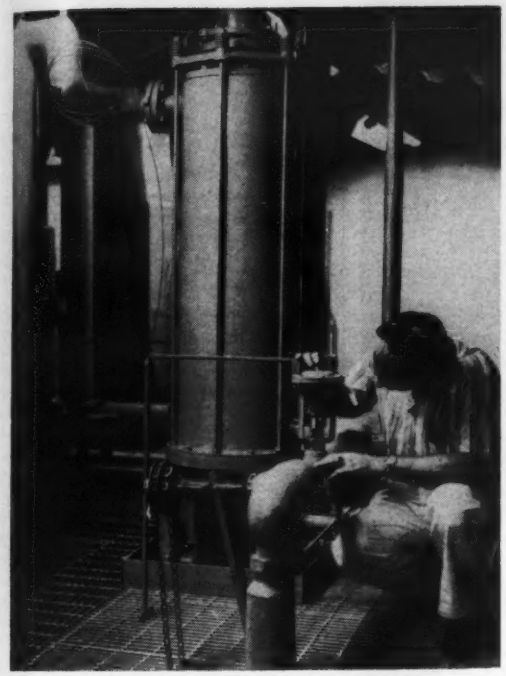
Condensers need no maintenance, have high heat transfer rate

Absence of cemented joints on compact, impervious graphite units handling corrosives prevents leakage and downtime for repairs

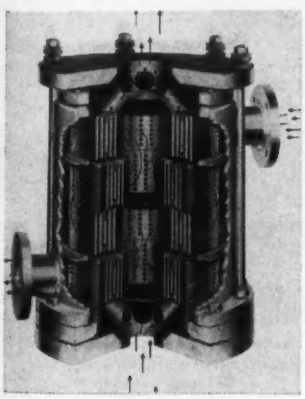
GORDON WEYERMULLER, Associate Editor
with **DR. F. R. LLOYD**
Assistant Director Chemical Manufacturing
Eli Lilly and Company, Indianapolis, Indiana

Impervious graphite heat exchangers have given excellent service at two plants of Eli Lilly handling a variety of corrosives. These exchangers, which are used as condensers, have been in service for one year to 18 months without any maintenance or leakage. Furthermore, these stacked block graphite units have been found to be about three times as efficient as conventional shell-and-tube exchangers.

Two of the condensers are in service at the Indianapolis plant of Eli Lilly and seven at the La Fayette plant. Others are being installed. They are handling HCl at strengths up to 35-36% at temperatures to 100°C. Among solvents being handled are ether, alcohol, acetone, acetic anhydride,



One of graphite exchangers in service at Lilly Chemical Manufacturing plant near La Fayette, Indiana



Cutaway view illustrates passages and flow through graphite exchanger

acetic acid, chlorobenzene, benzene, and naphtha.

The condensers are used over kettles in which intermediates are produced for manufacture of the tranquillizer, Ultran®, the analgesic, Darvon®, and the hypnotic, Valmid®. Condensers recover solvent or provide continuous condensation during reaction.

Principal reason for the success of the condensers at Lilly is that joints contain no cement to be leached out by the solvents handled and they have no fragile tubes. Passages in graphite blocks are drilled.

Experience at Lilly has shown the impervious graphite exchangers to have a heat transfer rate about three times as high as conventional shell-and-tube units. In other words, one of the Polybloc graphite exchangers will do the job of a conventional alloy unit three times its size. Cost is about equivalent to the alloy exchanger. Graphite crystals in blocks are properly oriented to assure maximum heat conductivity. Short passages and intermediate mixing chambers in blocks create high turbulence and high heat transfer.

Heat exchanger consists of a pile of cylindrical monolithic graphite blocks having two sets of flow passages for the two fluids. (See cutaway view.) In this case, one fluid

THIS

direct drive

BIFURCATOR® FAN

installed in duct makes fume removal an inside job

Installed directly in ductwork, space-saving DeBothezat Bifurcator Fans provide efficient direct drive power for fume removal.

Damaging fumes are kept away from the motor by a housing of acid-resistant metal alloy or of steel protectively coated with PVC (plasticized polyvinyl chloride) and many other types of synthetic linings. Fan wheels can also be made with similar anti-corrosion protection.

Save Installation Dollars

Installing a DeBothezat Bifurcator Fan is about as quick and simple as putting in a section of ductwork. Direct drive eliminates recurring maintenance problems. From space-saving installation to long-term operating economy, DeBothezat Bifurcator Fans keep costs down all the way. Contact a DeBothezat representative for further details or see our section in Sweet's Plant Engineering File.

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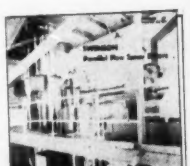
FOR FURTHER INFORMATION SWEET'S PLANT ENGINEERING FILE OR WRITE FOR COPY

Check 3746 opposite last page.

FLAVOR LADEN

RICH INSTANT COFFEE IS SWENSON "ENGINEERED"

Swenson engineers working with leading coffee roasters have developed spray drying equipment which produces the finest quality instant coffee. The many Swenson Soluble Coffee Dryers in use today are proving that flavor-laden instant coffee is profit-laden too. To capitalize on a wealth of experience in equipment for the food and other process industries, call on Swenson Evaporator Company.



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WHITING—MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY AND RAILROAD EQUIPMENT.

Check 3747 opposite last page.

is the vapor being condensed and the other fluid the water used to remove heat. One set of passages is parallel to axis and the other is arranged radially. Complete pile is held in compression by top and bottom steel compression plates and exterior tie rods. Outer casing of unit consists of sectional metal ring-shaped elements bolted together. Unit is also manufactured in single-shell design.

These impervious graphite exchangers are easily installed and readily adaptable to various methods of mountings. As photographs show, they do not take up much room. Inlet and outlet for the process fluid are drilled graphite headers.

(Polybloc impervious graphite heat exchangers are product of The Carbone Corporation, Boonton, N.J.)

Check 3748 opposite last page.

Sensitive instruments not endangered by pressure

Problem: Pressure elements, in two 400-psi suction-pressure gages, and in a 200-psi Brown instrument controller, are at times under pressures of as high as 500

Gage protectors guard Mercoid control used in field operations of Texas refinery

psi, at pumping stations along a large Texas pipeline system.

In field gathering operations of same organization, twelve Mercoid controls (rated at approximately 30 psi), which are used to automatically start and stop pumping units, are occasionally subjected to pressures in excess of rated capacity.

In former case, excessive

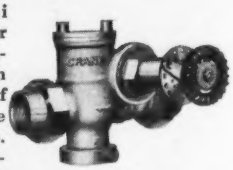
To page 48

PROCESS PIPING POINTERS

New Anti-Seize compound for high-temperature piping

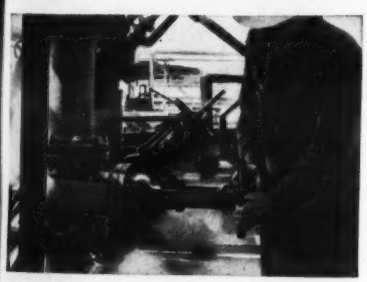
Developed especially to prevent seizing and galling of pipe threads, and bolts and gaskets on flanged joints, under high loading. Retains full lubricating properties up to 1050 F. Assures tight metal-to-metal contact; yet, joints open readily without damage to materials. Conforms to MIL-A-907. Supplied in 1- and 4-pound cans. For sample and literature—see below.

Bronze pressure regulator gives up to 80% reduction



This 250 psi steam or air pressure regulator delivers from 1 to 200 psi of outlet pressure in four ranges. Maintains precise, even outlet flow without build-up; unaffected by inlet fluctuations. Simple operation; compact design; all working parts are easily replaceable. Sizes ½ to 2 in. Ask for Bulletin AD-2268—see below.

High-nickel/high-chrome valve has long life on hot sulphuric sludge



In this big Oklahoma oil refinery, valves formerly used on hot sulphuric acid sludge mixtures (steam-diluted as low as 30%) were being replaced every 3 to 6 months. "Craneloy 20" gate valve (shown) went 14 months on same service, needed only minor repairs, was put right back into line. Read the facts; see next page.

For literature or data on product listed above, please contact J. E. Bradbury, Manager, Chemical Sales Dept. No obligation.

CRANE CO.

Gen'l Offices: 836 S. Michigan Ave., Chicago 5

VALVES • FITTINGS • PIPE

PLUMBING • HEATING • AIR CONDITIONING

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Check 3749 opposite last page.

CUT HERE AND FILE

Flow of Water Through Concrete Pipes

CLIFFORD L. DUCKWORTH
East Alton, Illinois

This nomograph permits one to estimate pressure drop in water flowing through concrete pipes of varying construction. It is based on equation[1]:

$$H = \frac{V^2}{C^2 d^{1.25}}$$

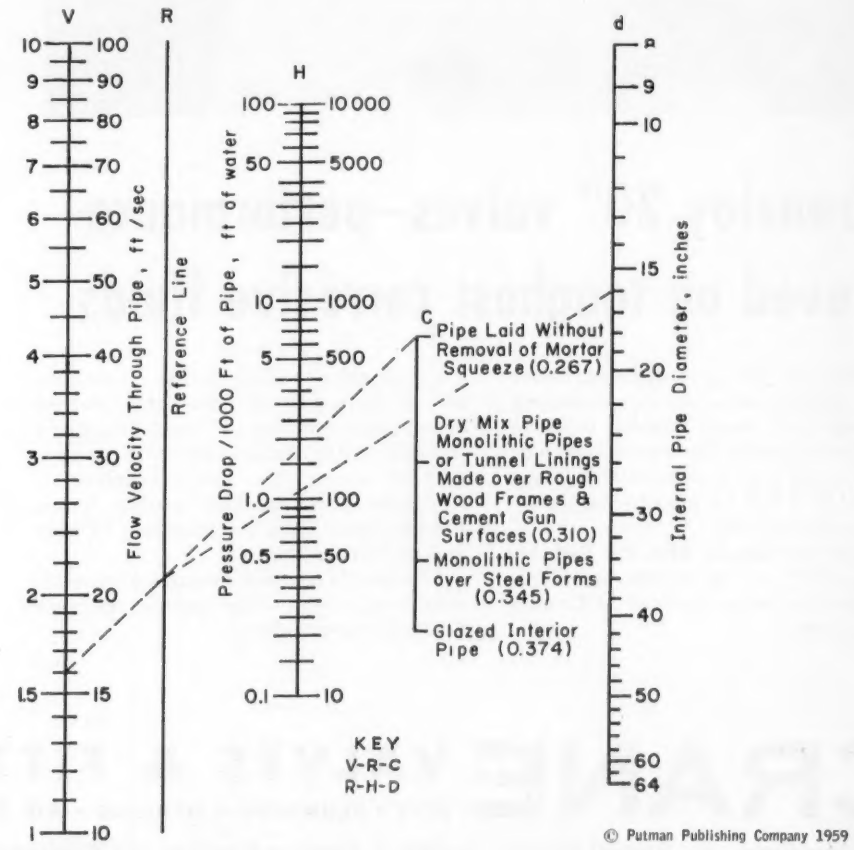
Where V is velocity in ft/sec, d is internal pipe diameter, C is a factor correlating type of construction, and H is the pressure drop in feet of water. It is applicable to pipes from 8 to 63.5″ in diameter. For expansion, flow velocity and pressure drop have been drawn as double scales.

Typical Example

Water is flowing through a 16″ pipe laid without removal of the mortar squeeze. The water velocity is 16 feet per second. A line is drawn between 16 on the V scale and the appropriate point on the C scale. A line connecting 16 on the d scale with the intersection on the reference line, R, crosses H at 110.

LITERATURE CITED

1) Brock, Maxey, "Chemical Engineering", 64, No. 2, 290 (1957).



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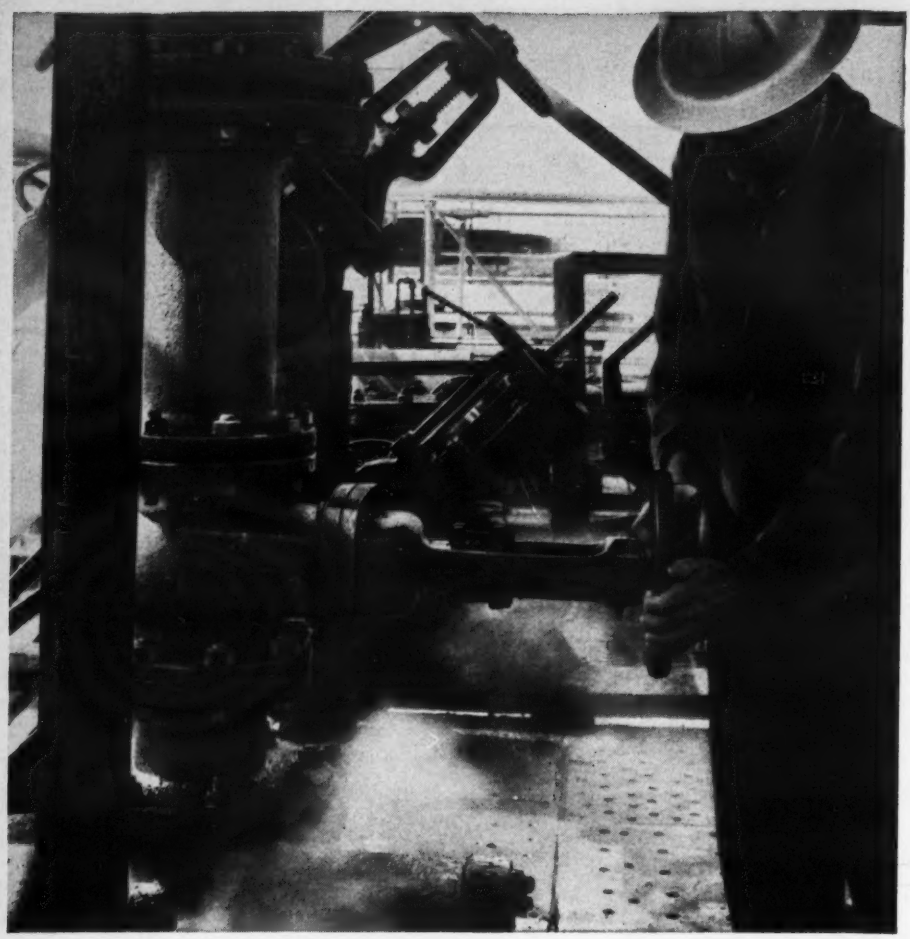
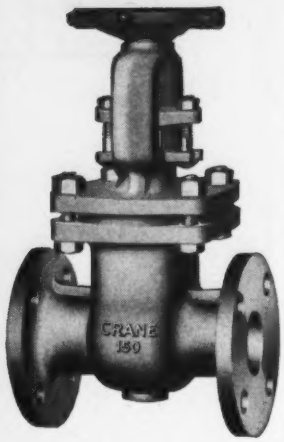
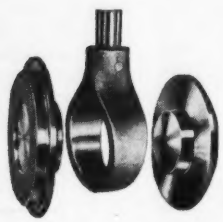




"Craneloy 20"—No. 20045 gate valve. ½" to 12"; 150 psi at 500 F; 230 psi at 100 F.



Crane split-wedge disc design. Free-to-rotate discs employ special guides to prevent rubbing against seat during operation.

"Craneloy 20" valves—performance-proved on toughest corrosive fluids

The "Craneloy 20" gate pictured above controls highly corrosive, hot sulphuric acid sludge at a large Western refinery. While other valves in this service had to be replaced every 3 to 6 months, this Crane valve lasted a full 14 months before requiring minor repairs.

All parts in contact with the flow are "Craneloy 20"—a high-nickel, high-chromium stainless alloy—poured in Crane's own foundries.

Crane alloy valves (either "Craneloy 20" or Type 316 stainless) give you an extra measure of value. Unique design of the split-wedge disc provides *uniform* pressure all around the seating surface . . . eliminates need for high seating forces. Free-to-rotate discs minimize seating wear and prevent galling.

For details of other features and applications of Crane alloy valves, see your Crane Representative.

Get full facts on "Craneloy 20" and other Crane quality alloy valves. Ask your Crane Representative for Circular AD-2080 or write to the address given below.

CRANE® VALVES & FITTINGS
PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Illinois—Branches and Wholesalers Serving All Areas

Check 3750 opposite last page.

NEW SOLUTIONS

From page 46

pressure occurs when station is not running, due to scraper runs and other causes. In latter instance, elevated pressures may have source in leaking check valve, scraper or plug runs in suction lines, or discharge pump located on suction side of automatic unit.

Solution: Pressure-sensitive-device protectors were installed between pressure sources and instruments. They are designed to cut off whenever pressure source exceeds preset cut-off point. It will reopen when pressure drops to approximately 2% below set point.

Standard body construction is either aluminum with Type-304 stainless trim or all Type 304 stainless steel. Models are available with either synthetic-rubber or Teflon diaphragm and synthetic-rubber O-rings in contact with line fluid.

Results: Protectors have been in successful operation for over one year, protecting pressure-sensitive instruments.

(Gage Gards are product of Industrial Engineering Corporation, 525-35 E. Woodbine Ave., Louisville 8, Ky.)

Check 3751 opposite last page.

No in-transit breakage with anti-skid bags

Problem: Multiwall-bag breakage due to bag slippage in cars during transit accounted for almost a third of the customer complaints filed on one product shipped from one Monsanto Chemical Company plant during a seven-month period. In fact, this was the largest single type of complaint.

The slick, printed bag surfaces caused other problems, too, throughout Monsanto's plants. Bags would jam and skid on high-speed conveyors. Use of storage space was at less than top efficiency since bags couldn't be safely stacked above a certain level. (This last factor also applied to Monsanto customers receiving and storing the products.)

To page 50

PRIME MOVER OF AIR

Aeromaster FANS

higher efficiency

lower operating costs

Aeromaster Fans move *hot* air more efficiently by delivering *more* CFM and requiring less horsepower. Adjustable pitch heat-treated aluminum alloy blades have excellent corrosion-resistance qualities. Used in refineries, gas transmission stations, steel mills and industrial plants for major heat transfer systems. 4 to 6 blade fans available 54" to 22' diameters. For more details on fans that cost less to install, operate and maintain, write: KOPPERS COMPANY, INC., 8309 Scott St., Baltimore 3, Md.

KOPPERS Aeromaster Fans

Engineered Products Sold with Service

Check 3752 opposite last page.

CUT HERE AND FILE

Temperature and Pressure Corrections to Rotameters Calibrated for Gases at Standard Conditions

F. E. SCHRAGE
Visking Company
Division of Union Carbide Corporation

Quite often rotameters supplied for gas-flow measurement are calibrated for particular gas flowing at standard conditons. In actual use, ambient conditons may be significantly different from standard conditions. In such cases correction must be applied to rotameter reading to obtain true flow.

Assuming perfect gas laws apply, following equation may be used to correct rotameter reading:

$$Q = R\sqrt{\frac{(P+14.7)(273)}{(14.7)(t+273)}}$$

where: Q = actual gas flow, wt/vol
R = rotameter reading
P = pressure in rotameter, psig
t = tempearture in rotameter, °C

Following nomograph, constructed according to procedure outlined by Davis[1], solves above equation. Units of actual gas flow correspond to the units for which rotameter is calibrated. Decimal point is similarly related.

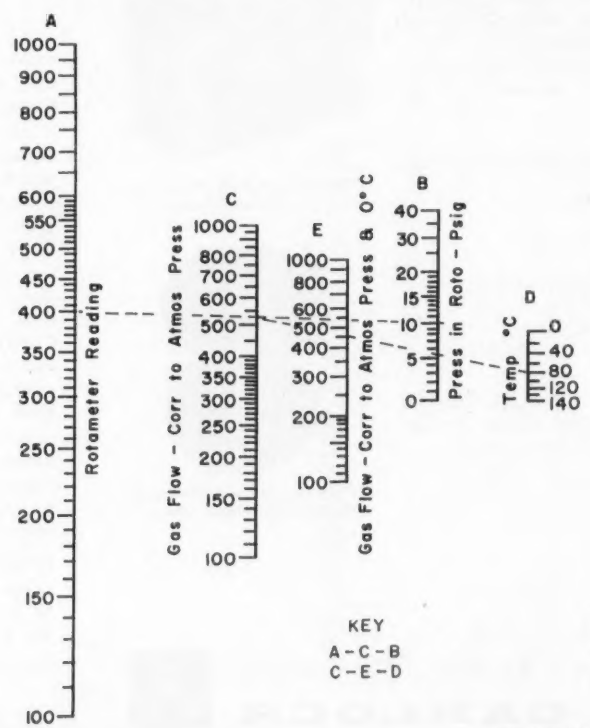
Typical Example

Air is flowing through a rotameter calibrated for air at standard conditions. The meter indicates flow of 40 cfm. Pressure is 10 psig and the temperature is 80°C.

Connect proper values on lines A and B. Read gas flow, corrected to atmospheric pressure, on line C. Connect this value on line C with the proper temperature on line D. Read gas flow (46 cfm), corrected to standard conditions, on line E.

LITERATURE CITED

1) Davis, D. S., "Nomography and Empirical Equations", Chap 6, Reinhold Publishing Corp., New York (1955).



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Here's a real cost-saving idea!

CORROSION-PROOF

YOUR PRESENT EQUIPMENT . . .

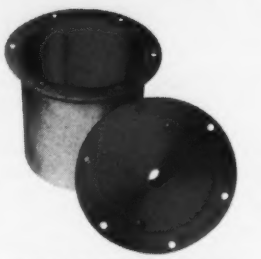
Trailer Tank with Chemiseal Fluorocarbon Plastic Lining applied.

WITH CHEMISEAL* FLUOROCARBON LININGS

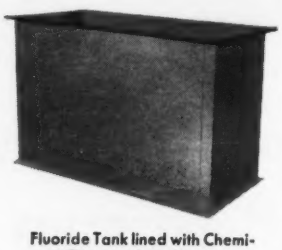
Instead of buying new equipment for corrosive service, simply have Chemiseal FLUOROCARBON PLASTIC LININGS applied to existing equipment. It's your assurance of positive chemical resistance without the high cost of special alloys, cladding, fused or baked linings!

Hydrochloric, hydrofluoric, and nitric acids, plus the stronger alkalies, oxidants, and solvents, cannot harm Chemiseal FLUOROCARBON PLASTIC LININGS. They're easy to clean, non-brittle, non-contaminating, non-flammable, and can be used in temperatures ranging from −320°F to +250°F.

Most contours and materials (glass, wood, metal, concrete) can be covered easily and efficiently with Chemiseal FLUOROCARBON PLASTIC LININGS. Contact the skilled, factory-trained applicator nearest you for details on your application:



Reactor Pot lined with Chemiseal Fluorocarbon Plastic.



Fluoride Tank lined with Chemiseal Fluorocarbon Plastic.

Pipe Coupling with Chemiseal Fluorocarbon Plastic Lining.

THE BARBER-WEBB COMPANY, INC., Los Angeles, Cal.
BELKE MFG. CO., INC., Chicago, Illinois
BUCKLEY IRON WORKS, Dorchester, Mass.
ELECTRO-CHEMICAL ENGRG. & MFG. CO., Emmaus, Pa.
LINCO, INC., Houston, Texas
METALWELD, INC., Philadelphia, Pa.

Or, write for Bulletin AD-152, Special Products Dept., United States Gasket Company, Camden 1, New Jersey.

*Registered trademark

United States Gasket *Plastics Division of* **GARLOCK**

Check 3753 opposite last page.

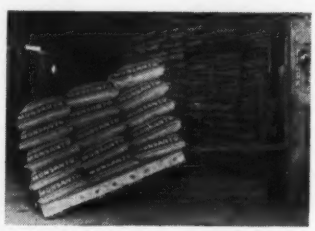
NEW SOLUTIONS

From page 48

Solution: For many of its products, including the one mentioned above, Monsanto has switched to packaging in non-skid multiwalls. The anti-slip treatment is provided by Syton P, a colloidal silica solution that is diluted with water and applied to bag surface.

The material is not sticky and does not tear the paper when separating the bags. It does not knurl up on surface when rubbed, helps prevent soiling, doesn't reduce bag strength, and permits glossy printing. Treatment works as well for corrugated, solid fiber, and folding carton boxes.

Results: Since the switch, one million bags ago, the specific plant cited above has not received a single complaint due to slippage of load in transit.



Anti-skid bags won't slip, even at this angle

All of the company's Inorganic Chemicals Division plants use treated bags exclusively for products customarily shipped in multiwalls. Both the Plastics Division and Organic Chemicals Division are shipping some products in the anti-skid bags. Customers have expressed a liking for the new method of packaging. Certain sales have been clinched by the feature.

Monsanto plants and warehouses report that the bags palletize easier, can be stacked higher, eliminate jamming and skidding on conveyors.

(Syton P is product of Monsanto Chemical Company, 800 N. Lindbergh Blvd., St. Louis 66, Missouri.)

Check 3754 opposite last page.

(For more information on anti-skid multiwall bags, check 3755 opposite last page.)

New!

ELGIN Junior 120* DEIONIZER

Delivers up to 120 GPH of *high quality deionized water

Now a deionizer that fills a long felt need — a unit for those whose needs are not great enough to justify a large deionizer, but too great to be handled by small, portable laboratory apparatus. It gives you high quality water comparable to that produced by the Elgin mixed-bed Ultra Deionizer — water actually freer from mineral impurities than distilled water . . . at continuous flow rates up to 120 gallons per hour, and at remarkably low cost!

Illustration tells story. This compact unit — only 45" high — comes to you complete and ready to go. Hooks right into your water supply line. Delivers demineralized water under line pressure any place you want it. Handsome stainless steel cylinder contains four bags of resin ion exchange material that does the work. When resistance of effluent falls below 50,000 ohms (the measure of commercially distilled water) built-in ohm meter actuates pilot signal and you replace spent material with fresh bags which are supplied right with the unit. Then you return the exhausted bags to Elgin in convenient shipping container which we furnish. We then promptly regenerate it and return it to you so that *you always have a fresh supply on hand* . . . a planned and organized service. There is: —

No regeneration — no acid or alkali to handle — no backwashing — no drain needed — no trained operator required. Our well organized resin exchange service does the whole job for you. Cost of equipment and service is low. Final result: continuous supply at way below distilled water costs.

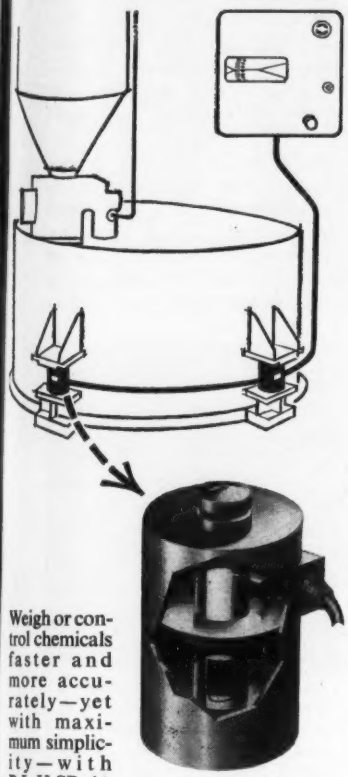
Write for facts

ELGIN SOFTENER CORPORATION
180 N. Grove Ave., Elgin, Illinois
Representatives in principal cities
In Canada: G. F. Sterne & Sons Ltd., Brantford

Check 3756 opposite last page.

MEASURING QUANTITY?

Then do it the modern way ...with accurate, rugged, trouble-free SR-4® Load Cells



Weigh or control chemicals faster and more accurately—yet with maximum simplicity—with B-L-H SR-4® Load Cells. Installed as part of the tank support structure, no part of the measuring system comes in contact with the contents of the tank. Can be installed on tanks already in use. Output suitable for use with local or remote indicator, recorder or automatic dispensing control. Explosion-proof. Hermetically sealed—unaffected by dust, grease or moisture; long service life assured. Available in standard capacities of 50 through 200,000 lb., accuracies to ±0.10%.

For more information on load cells and complete batching systems, write Dept. 16-I and ask for Bulletins 4355 and 4510

FIRST in force measurement

SR-4 BLH BALDWIN LIMA HAMILTON

BALDWIN·LIMA·HAMILTON

Electronics & Instrumentation Division
Waltham, Mass.

SR-4® Strain Gages • Transducers • Testing Machines

Check 3757 opposite last page.

CUT HERE AND FILE

Paper-machine Production Nomograph

G. LEWIS

Daily production of a paper machine can be determined by use of following equation:

$$P = STW\ (2.00 \times 10^{-5})$$

where: S = speed, ft/min
T = trim, inches
W = ream weight, 24 × 36", 500 sheets
P = production, tons/24-hr day

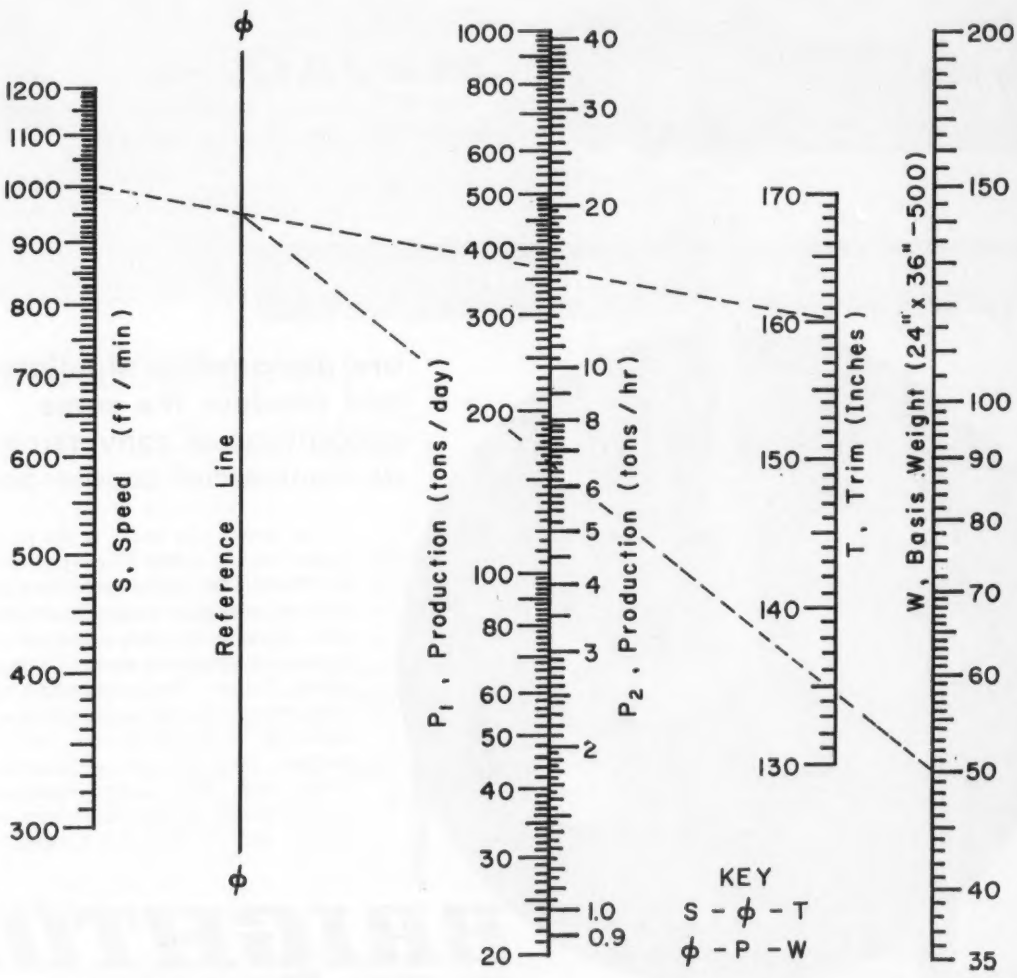
This equation can readily be solved through use of accompanying nomograph.[1]

Typical Example

If the machine speed is 1000 ft/min with trim of 160" and a ream weight of 50 lb, then production rate is 160 tons/day or 6.67 tons/hr as indicated by P_1 and P_2 respectively.

LITERATURE CITED

1) D. S. Davis, "Nomography and Empirical Equations", Chapter V, McGraw-Hill Book Co., Inc. (1943).


S, Speed (ft / min)
Reference Line
P1, Production (tons / day)
P2, Production (tons / hr)
T, Trim (Inches)
W, Basis Weight (24" x 36"-500)
KEY
S - ϕ - T
ϕ - P - W

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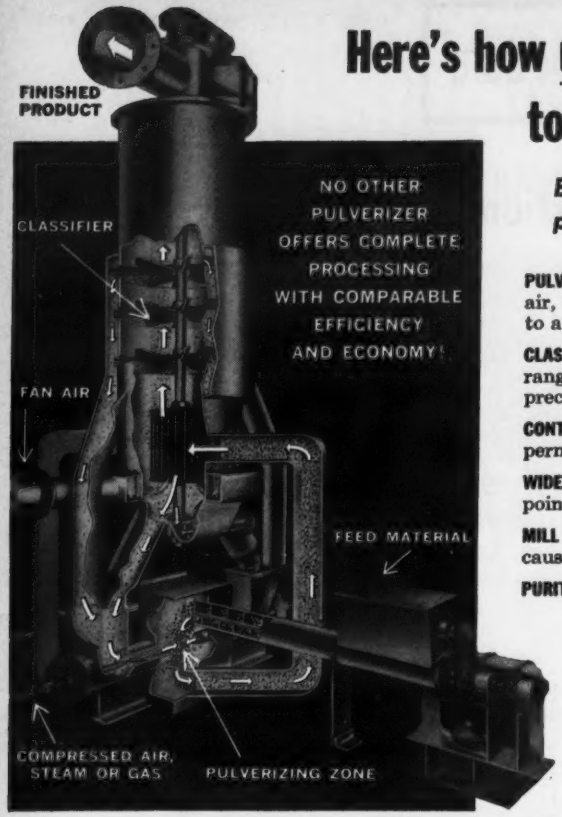


Here's how unique MAJAC Jet Principle works to improve Pulverizing Process!

Economy and efficiency of exclusive Jet-Stream collision process unmatched by any other pulverizer!

PULVERIZES by collision of particles in high velocity jet streams of air, steam, or gas. Produces particle sizes as coarse as ¼" down to a top size of a few microns.

CLASSIFIES with unusual efficiency and accuracy within a broad range of variable settings. Classifier integral but separately and precisely controlled.

CONTROLS HUMIDITY, dries, blends or coats material as desired. Even permits chemical reactions.

WIDE RANGE OF MATERIALS can be handled from soft low-melting point organics to hardest abrasive materials.

MILL WEAR and maintenance are reduced to absolute minimum because particles collide with each other instead of wearing mill.

PURITY is maintained at highest level because of minimum mill wear.

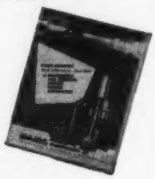
Sizes available for lab, pilot plant and production use.

Write today for detailed information or visit by qualified Majac representative.

MAJAC, INC.

Twenty-third St., Sharpsburg, Pittsburgh 15, Pa.

Designers and manufacturers of pulverizing, classifying and separating equipment for industry.



Check 3758 opposite last page.

BRIGHTON LAB AND PILOT PLANTS

are designed to simulate and produce the same percentage of conversion as commercial counterparts

"Look Before you Leap" at the precise results you can obtain from a pilot plant by BRIGHTON, before you move into full scale production of a product. Brighton Pilot Plants produce data consistent with commercial operations, save you time and money. Stainless Steel construction provides physical strength at operating temperatures; is corrosion and oxidation resistant, and prevents contamination which could affect control equipment, product purity, product distribution and catalyst activity. Write For Catalog.

BRIGHTON

METALSMITHS EST. 1914

CORPORATION

820 STATE AVENUE · CINCINNATI 4, OHIO

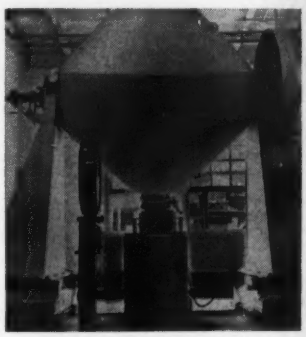
Check 3759 opposite last page.

Drying, blending combined for pigmented powder to save $6400/year

Conical dryer-blender unit halves cycle time

Problem: Tray drying and separate blending of a highly pigmented powder was time-consuming operation, requiring about 24 hr per batch, at Merck & Company, Inc., Rahway, New Jersey.

Solution: A conical dryer-blender was incorporated to simultaneously dry and blend the pigmented powder. Glassed-steel construction of unit permits processing of acidic products without corrosion danger. It is resistant to all acids except hydrofluoric.



Use of conical dryer-blender to process pigmented powder, in place of separate tray-drying and blending operations, has cut batch processing time from 24 to 12 hr

Dryer-blenders are available in 2, 4, 6, and 8′ ID sizes. These would represent normal working capacities of approximately 3 to 165 cu ft.

Results: Utilization of the dryer-blender has resulted in savings of $6400/year. Cycle time now is only 12 hr. More uniform blend has also been produced.

Cash savings result from reduced dusting losses in process area, recovery of solvent, and reduction in manpower requirements.

(Conical dryer-blender is product of The Pfaudler Co., Division of Pfaudler Permutit Inc., 1087 West Ave., Rochester 3, N.Y.)

Check 3760 opposite last page.

THAT'S INTERESTING

Plastic ribbon

The thinnest typewriter ribbon ever made is manufactured from plastic film. Manufacturing Chemists' Association's *Chemical News* reports it is unbreakable and increases sharpness of typed image. It is designed for carbon-ribbon machines.

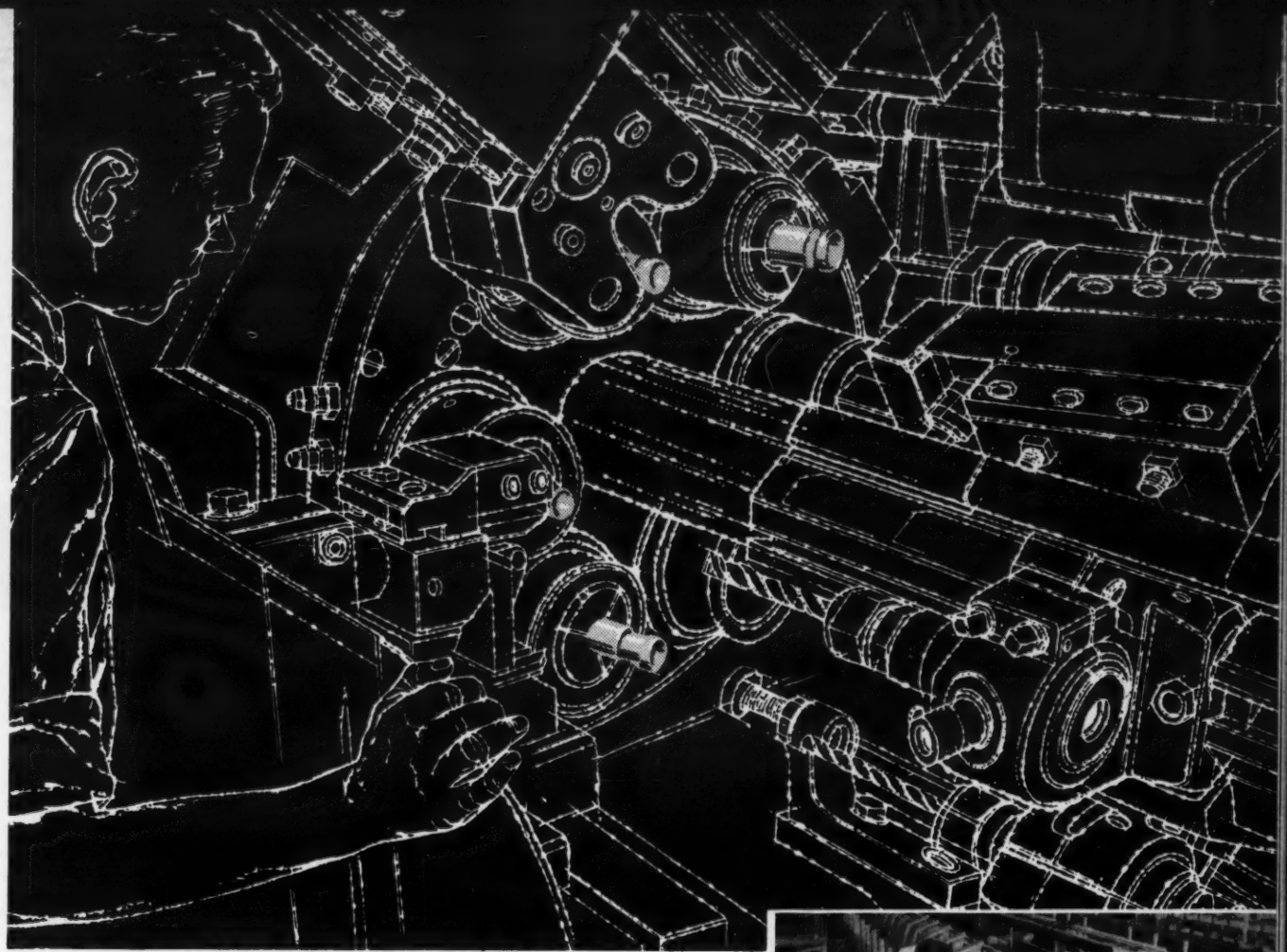
CPI is leader in drum uses

The chemical industry last year took 41.7% of all steel drums made. The petroleum industry, until 1957 the largest user, took 38.6% in 1958.

Engineers to be fewer

Although faced with the greatest need in history for trained engineers, freshman engineering enrollment in U.S. has dropped markedly for the first time in eight years, the Engineers Joint Council reports.

For more information on product at right, specify 3761 see information request blank opposite last page.



The Ultimate Test

The ultimate test of quality in stainless steel bars takes place in screw machine production, where every bar is literally cut to pieces.

The Perry-Fay Company, Elyria, Ohio, a leader in screw machine production, has been subjecting J&L bars to this demanding production-line test for more than a year, **without a single failure, without a single reject.** Perry-Fay reports: "We consistently get superior surface finish, closer tolerances, fully formed rolled threads with J&L stainless bars."

Whether you need stainless steel bar stock for high-speed, high-production operations, or a single bar for extraordinary requirements, turn to J&L. J&L leads the industry in melt shop standards for stainless steel, the point where quality starts—and new production profits begin.

Careful attention to every production detail is the key to J&L quality.

J&L STAINLESS
SHEET • STRIP • BAR • WIRE

Plants and Service Centers:
Los Angeles • Kenilworth (N. J.) • Youngstown • Louisville (Ohio) • Indianapolis • Detroit

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Box 4606, Detroit 34

At Lawter Chemicals, Inc., dye and carrier resin components are "cooked" with constant mixing in this heated Baker Perkins mixer. Batch sizes range from 200-800 lb. Pilot plant installation can be seen in background

Long an eye catching part of graphic arts, fluorescent pigments are now coming into their own in safety paints for military and commercial aircraft. Sulfonamide-resin pigment carriers and acrylic vehicles are two leaders

Resin Developments Help Brighten Fluorescent Pigment Future

FLUORESCENT paints and pigments form a fast rising portion of the coating world with increased interest being shown in safety, packaging, and other industrial applications.

Most important among the improved characteristics which have fitted these brilliant products for an increased industrial role is a manyfold multiplication of light fastness. Early products often faded or failed in a week or less under outdoor conditions, particularly where exposure to ultraviolet light was high. Effective service life now approaches 80 times this figure. Accompanying this improvement in light fastness have been better weatherability through tougher film forming vehicles, and improved fluorescence.

Brush and Spray Paint
Typical Formulation[1]

Ingredients	lb	gal
Roller Mill Grind		
Acryloid F-10[2]	44.1	5.82
Fluorescent pigment	30.4	2.68
Syloid 244[3]	3.7	0.22
Mill and Mix with:		
Mineral spirits	11.8	1.79
Xylol	10.0	1.39

1. Formulation developed by Lawter Chemicals, Inc.
2. Supplied by Rohm & Haas Co.
3. Supplied by Davison Chemical Corp.

How They Work

Basically, fluorescent paints obtain their visual effect when white light passes through several layers of semitransparent pigment, hits a white reflective undercoat, and bounces back in highly intensified form. Spectral conversion within pigments changes shorter violet and blue wave lengths to orange, red, and yellow hues.

Conventional color pigments selectively reflect certain portions of visible spectrum of light; remaining wave lengths are absorbed and dissipated as heat. At extreme distances, these pigments appear to the eye as neutral colors, frequently blending into the background.

Fluorescent pigments also reflect certain portions of spectrum — and absorb remaining wave lengths. However, most of the absorbed portion is transformed into emitted light of same hue as that reflected. Color obtained is much more brilliant. Laboratory and field experiments indicate that reflected light is as much as 100% greater.

Solving Early Problems

Playing major roles in improving character of fluorescent paints and pigments, and in breaking early production bottlenecks have been sulfonamide and acrylic resins, with alkyds also contributing significantly.

Up to as recently as three years ago, fluorescent pigments were produced using thermosetting resins. Resulting pigments could not be handled well in production. Particle size was large because grinding was difficult. This resulted in poor color quality and short life. In addition, pigments were hard to work, hindering formulating.

Thermoplastic resins are

now used almost exclusively. One company, Lawter Chemicals, Inc., of Chicago, uses a clear, friable resin carrier based on an aryl sulfonamide* for their Hi-Viz fluorescent products. Resin components and dye are mixed and heated (maximum temperature 300°F) in batches of 200-800 lb. A modified sulfonamide aldehyde resin is formed which incorporates the dye. Friable nature of this thermoplastic material permits grinding to 2½ to 3 microns in air-swept mill.

This development greatly increased light fastness of pigments as well as ending problems formerly encountered in handling and formulating.

Another step toward more brilliant, longer-lasting paints was aided by acrylic polymers. Clear acrylic films have excellent water-clear transparency and transmit light of wave length required for optimum utilization of pigment's fluorescigenous properties. Refractive indexes are close to that of pigment-carrier resin assuring color brilliance and purity of hue. Films resist yellowing and degradation from ultraviolet light and weathering.

Suitable acrylic resins are based on polymers of esters of acrylic and methacrylic acids. Coating resins are usually supplied in solution in organic solvents. Protective films are formed by solvent evaporation. No oxidation or polymerization occurs during drying process.

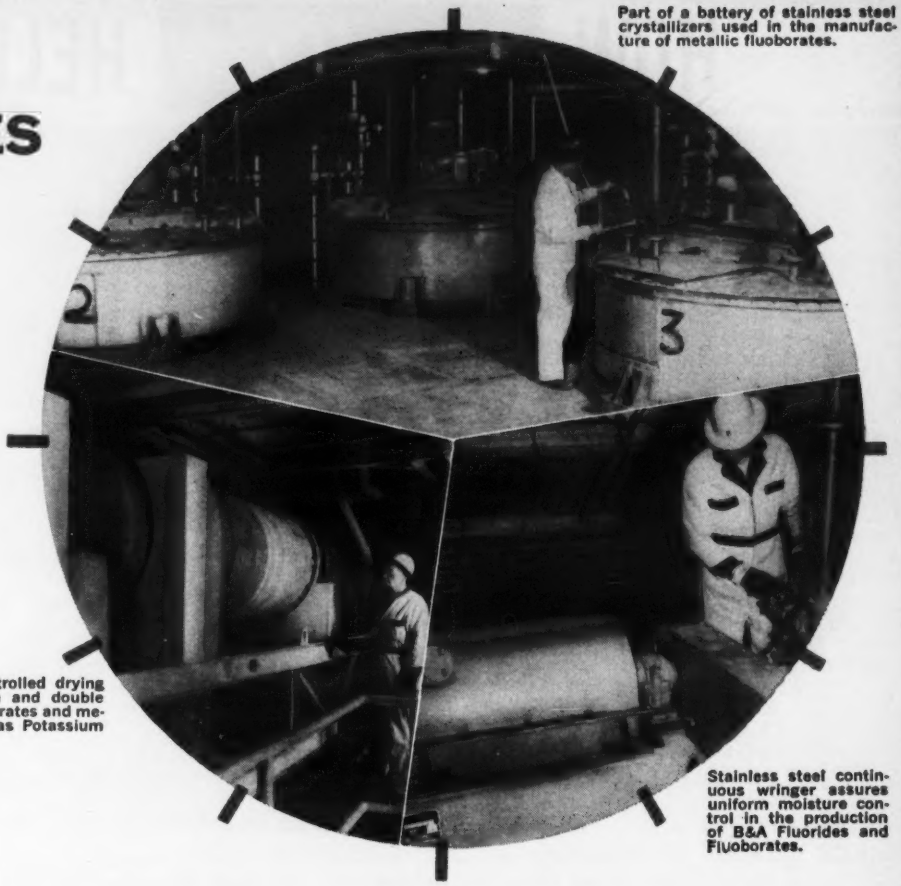
Other vehicles have also been utilized. Alkyds, although slightly darker than acrylics, form a low-cost base for paints having good brushability and fast drying but at some sacrifice in light fastness. For some specialty applications vinyls, epoxides, and cellulosics are used.

Ultraviolet Absorbers

Even the improved fluorescent pigments are very slowly changed by long-term direct exposure to intense sunlight. Change is not primarily

*Supplied by Monsanto Chemical Co.

FLUORIDES 'ROUND THE CLOCK!



Part of a battery of stainless steel crystallizers used in the manufacture of metallic fluoborates.

Rotary dryer for controlled drying of high purity single and double fluorides, alkali fluoborates and metallic fluorides such as Potassium Titanium Fluoride.

Stainless steel continuous wringer assures uniform moisture control in the production of B&A Fluorides and Fluoborates.

General Chemical's continuous production assures you of dependable, uninterrupted supply

Shown above is part of the versatile process equipment that works round the clock producing America's broadest line of fluorides and fluoborates. The place—General Chemical's Baker & Adamson Works in Marcus Hook, Pennsylvania.

With its broad experience in fluorine chemistry and its extensive production facilities, General Chemical is geared to meet Industry's every need . . . from experimental quantities to commercial tonnages.

Today, our "Baker & Adamson" line includes more than 75 inorganic fluorine compounds. Among them are the following fluorides and fluoborates:

Fluoboric Acid
Potassium Bifluoride
Sodium Bifluoride
Potassium Fluoborates
Potassium Titanium Fluoride
Sodium Fluoborate
Ammonium Fluoborate
High Purity Hydrofluoric Acid
(Electronic, C.P. and Reagent Grades)

For complete list of "B&A" fluorides and fluoborates or for further data on the specific products of interest to you—write or phone the nearest General Chemical office.

BAKER & ADAMSON®
Fine Chemicals

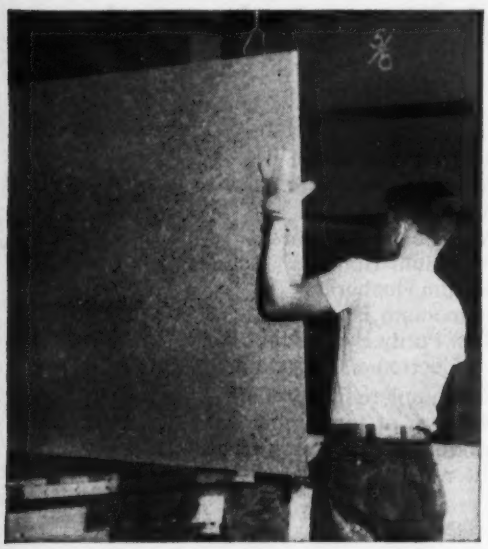
Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

Check 3762 opposite last page.

HOW HERCULES HELPS...

PACKAGE GLAMOUR TO PERFECTION—Pro-fax®, Hercules polypropylene, does it in this striking new aerosol container for Coty Spray Cologne. Called Petite Mist, it's available in four enchanting fragrances, in a choice of two eye-catching color combinations . . . either jet black or snow white, richly decorated with gold. Especially designed as a sturdy, lightweight travelling accessory, Petite Mist is equally at home in the most delicate feminine boudoir. For this truly modern package, Coty naturally specified Pro-fax—the truly modern plastic. Economical Pro-fax can live up to the most imaginative designer's expectations.



MODERN BUILDING TECHNIQUES—Particle board used as core stock in kitchen cabinets and plywood partitions as well as for floor underlayment relies on Paracol®. This Hercules wax emulsion adds water resistance and increases dimensional stability of the board. Paracol treated board has less tendency to warp, can be sawed more readily, holds nails firmly.

HOTELS "LOOK LIKE A MILLION"—Multicolor lacquer enamel was the finish chosen inside and out by the multimillion dollar Hotel Pierre Marques in Acapulco. An attractive, tough, durable finish, it constantly withstands ocean spray and high humidity. Multicolor lacquer is available under different brand names from many paint manufacturers.

HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

CHEMICAL MATERIALS FOR INDUSTRY

HERCULES

669-6

Check 3763 opposite last page.

one of darkening or dulling, but rather one of becoming gradually lighter in hue, although it is accompanied by some diminution of intensity.

This change in hue and intensity is retarded by addition of selected ultraviolet light absorbers of type used extensively to protect food products, pigments, and resinous materials against deterioration by ultraviolet light. Absorbers can be incorporated directly in paint formulation or in a clear topcoat applied later. They are most effective in red shades. Absorbers that have been used successfully are substituted benzophenones or benzotriazoles.

(Fluorescent pigments and paints are supplied by Lawter Chemicals, Inc., 3550 Touhy Ave., Chicago, Ill.)

Check 3764 opposite last page.

(For more information on acrylic or alkyd resins contact Rohm & Haas Co., Washington Square, Philadelphia 5, Pennsylvania.)

Check 3765 opposite last page.

(Uvinul D490 ultraviolet light absorber is a product of General Aniline & Film Corp., 230 Park Ave., New York, New York.)

Check 3766 opposite last page.

'Absolute' color standard for styrene provided by computer

Analog unit matches colors 'seen' by spectrophotometer

Precise color control in styrene molding compounds is being achieved through utilization of a spectrophotometer and especially designed analog computer at Monsanto Chemical Company, St. Louis, Missouri. System allows mathematically precise color control during full-scale production operations. It is based on a complicated mathematical theory which takes into account color variables of hue, purity, and value called "chromaticity coefficients." Color can be specified without reference to a sample.

Under this Micro-Match color system, all colors have a designation, mathematically precise, unvarying, and "absolute." Color can be produced uniformly and accurately from batch to batch. Variances too minute for the human eye to distinguish can be determined and corrected. Errors in color matching due to differences in lighting conditions, aging, or loss of original samples are eliminated.

By permitting immediate, accurate color matching, delivery times are shortened and substantiating data can be furnished with shipments.

(Micro-Match colors are supplied by Monsanto Chemical Co., Plastics Division, Springfield 1, Mass.)

Check 3767 opposite last page.

Butylene oxide isomer produced in quantity

Uses: Derivatives are utilized as surfactants, emulsifiers, oil and gasoline additives, flotation agents, and textile assistants.

Features: Commercial quantities of 1,2-butylene oxide of 98% purity now available.

Description: Exhibits increased reactivity as compared to isomeric mixtures. In some systems, reaction rate is doubled. Since derivatives are pure compounds, more precise control over reaction products is possible.

(Butylene oxide isomers are available from Technical Service and Development Department, The Dow Chemical Company, Midland, Mich.)

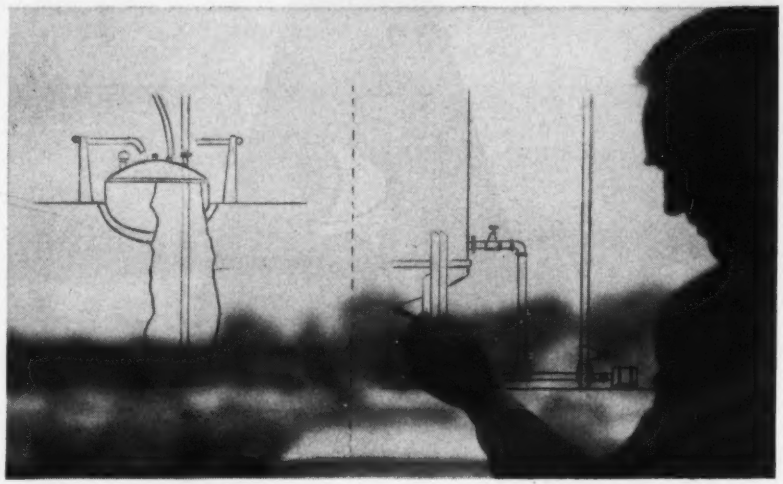
Check 3768 opposite last page.

NEXT MONTH

What will be the future of molybdenum and tungsten derivatives? Leading off next month's Chemical Materials section will be an article exploring possible applications of Mo and W compounds in many fields including catalysts, intermediates, corrosion inhibitors, and lubricants.

BRIEFS

on a useful manual on handling caustic soda . . . phosphorus chlorides for organic synthesis . . . a special plasticizer for vinyl plastics



Caustic soda handling from tank car to process

An authoritative study of this subject is covered in our *Caustic Soda Engineering and Handling Guide*, a 40-page manual designed for engineers.

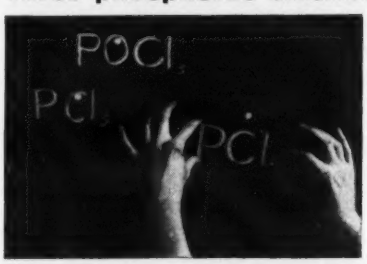
This manual puts at your finger tips the essentials on handling and storing liquid caustic soda, with emphasis on safety, efficiency, and minimum contamination.

It includes:

- Detailed diagrams of equipment for unloading, diluting, and storing.
- Commonly used methods of unloading tank cars.
- Materials of construction.
- Safety precautions and first aid.
- Graphs and tables on such properties as dilution temperature, vapor pressure, viscosity, and specific heat.

Check coupon for a copy.

Three phosphorus chlorides for organic synthesis



If you're ever looking for commercial quantities of versatile intermediates for introducing phosphorus and/or chlorine into an organic, check back on this family of Hooker phosphorus chlorides:

Phosphorus oxychloride. A clear, water-white liquid, typically 99.8% pure. Only 0.01% phosphorus trichloride. No free chlorine or phosphorus pentachloride. Iron at less than 1 ppm.

Phosphorus trichloride. Also a clear and water-white liquid. 99.9% pure. No free phosphorus.

Phosphorus pentachloride. Often used in pilot work and other areas where only small quantities are involved. Not only more reactive than the trichloride, but offers the convenience of a powder form for use in small reactors. No phosphorus trichloride or nickel. 1 ppm lead. 2 ppm iron.

For more data, check coupon.

Formulators of polyvinyl chlorides take note...

We offer for your perusal a bulletin which can help you improve vinyl compositions in five different ways. Count them. Impart flame retardance. Get higher resistance to water, oil, and gasoline. Get high permanence on heating. Get high tensile strength joined with high flexibility. Lessen migration.

The source of these many improvements is our MPS-500® plasticizer.

MPS-500 is a *stabilized* chlorinated ester of a fatty acid. It finds use, primarily with other plasticizers, in vinyl films, upholstery, drapery, electrical insulations, and shoe soles.

MPS-500 is completely compatible with the polyvinyl chloride polymers in ratios as high as 60 parts per 100.

For more facts, send the coupon.

For more information check here and mail with your name, title, and company address:

- ☐ Caustic Soda Manual
- ☐ Caustic Soda Data Sheet
- ☐ Phosphorus Oxychloride Data Sheet
- ☐ Phosphorus Pentachloride Data Sheet
- ☐ Phosphorus Trichloride Data Sheet
- ☐ MPS-500 Bulletin

When requesting samples, please use business letterhead to help speed delivery.

HOOKER CHEMICAL CORPORATION
509 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

Sales Offices: Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS

Check 3769 opposite last page.

New Vinyl-Acrylic

COPOLYMER SOLUTION

Another example of original resin research at National's Plainfield, N. J. laboratories. Built in 1952. Doubled in 1955. Expanded in 1957. With major expansion now in planning.

FOR FLEXIBLE AND PRESSURE SENSITIVE ADHESIVE COATINGS

A new, unique copolymer solution. Ideal for flexible film laminations and pressure sensitive adhesive formulations. Exhibits specific adhesion to most cellulosic and synthetic surfaces.

Application possibilities for this tacky, flexible film former are many. In laminations of "Mylar"* polyester film, cellophane, nylon, polyethylene, saran, paper, foil. In packaging adhesives. In pressure sensitive and specialty adhesives. In printing inks.

This new base is noncorrosive. Exhibits excellent heat and light stability. It can be used as is or modified to accentuate specific characteristics. Technical data and information on compatibility with other film formers, resins, tackifiers and solvents are available. Just contact your nearest National office asking for our New Product Bulletin on Resyn® 26-2404.

*Du Pont's reg. trademark.

RESIN DIVISION National STARCH and CHEMICAL CORPORATION

750 Third Avenue, New York 17
3641 So. Washtenaw Avenue, Chicago 32
735 Battery Street, San Francisco 11

Check 3770 opposite last page.

Output up, costs down

. . . with use of promoted cobalt molybdate catalyst on improved carrier for selective hydrogenation of acetylene in raw ethylene streams, according to manufacturer.

Greater space velocities than any other catalyst of its type are reported. It inhibits polymer formation, extending cycles between regenerations to 30 and 40 weeks, and may be used with wide variations in operating pressure, feed-gas composition, and sulfur content.

(G-54 catalyst is product of Girdler Catalysts, Chemical Products Division, Chemetron Corporation, PO Box 337, Louisville 1, Ky.)

Check 3771 opposite last page.

Commercial production of lauryl bromide

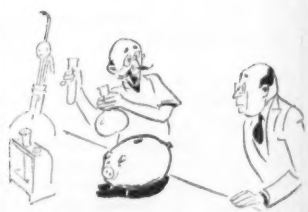
Uses: As intermediate in preparing quaternary ammonium salts exhibiting germicidal and algicidal activity.

Feature: Available in commercial quantity.

Description: High purity—bromine content of 30%, free alcohol content of less than 1%, specific gravity of 1.020 to 1.028. Quaternary salts made with lauryl bromide are used in pharmaceuticals, sanitizers, softening agents, surfactants, and in algae- and slime-control compounds.

(Lauryl bromide is manufactured commercially by Michigan Chemical Corporation, Saint Louis, Mich.)

Check 3772 opposite last page.



"Somebody's always offering me a penny for my thoughts!"

THAT'S INTERESTING

Inventors group sends SOS

The nation's civilian inventors have been asked by the National Inventors Council for help in producing 28 new devices or systems needed by the Armed Forces. Among inventions needed are a "Buck Rogers" type of rocket lift device a man can wear to shoot him across difficult terrain, or to ease him back to earth from a plane, or small, new instruments and electronic components.

Lung cancer culprit

Two Polish scientists believe radioactive tobacco smoke causes lung cancer blamed on heavy cigaret smoking. They say tobacco plants take in carbon-14 from the air. As cigaret burns, the radioactive element enters the lungs with the smoke.

For more information on product at right, specify 3773 see information request blank opposite last page.

PELLETIZED PENTAERYTHRITOL

You can see . . . No dusting!

Nice set-up, but couldn't you just blow on the pellets?
Might run out of breath—and there's so much to tell!

Such as?
Ease of handling. Non-stop reactor runs.

Meaning . . .?
The amount of pelletized PE you weigh out is the amount you charge into the reactor. No dust losses! No more interruption of cooking cycles to add more of the polyol!

So?
So, shorter cook time and faster output of alkyd resins.

Interesting! What more?
No dust means reduced hazard of explosion or fire.

What about product quality . . .
Pellets are less exposed to hot reactor surfaces and air. You can produce better resins of lighter color.

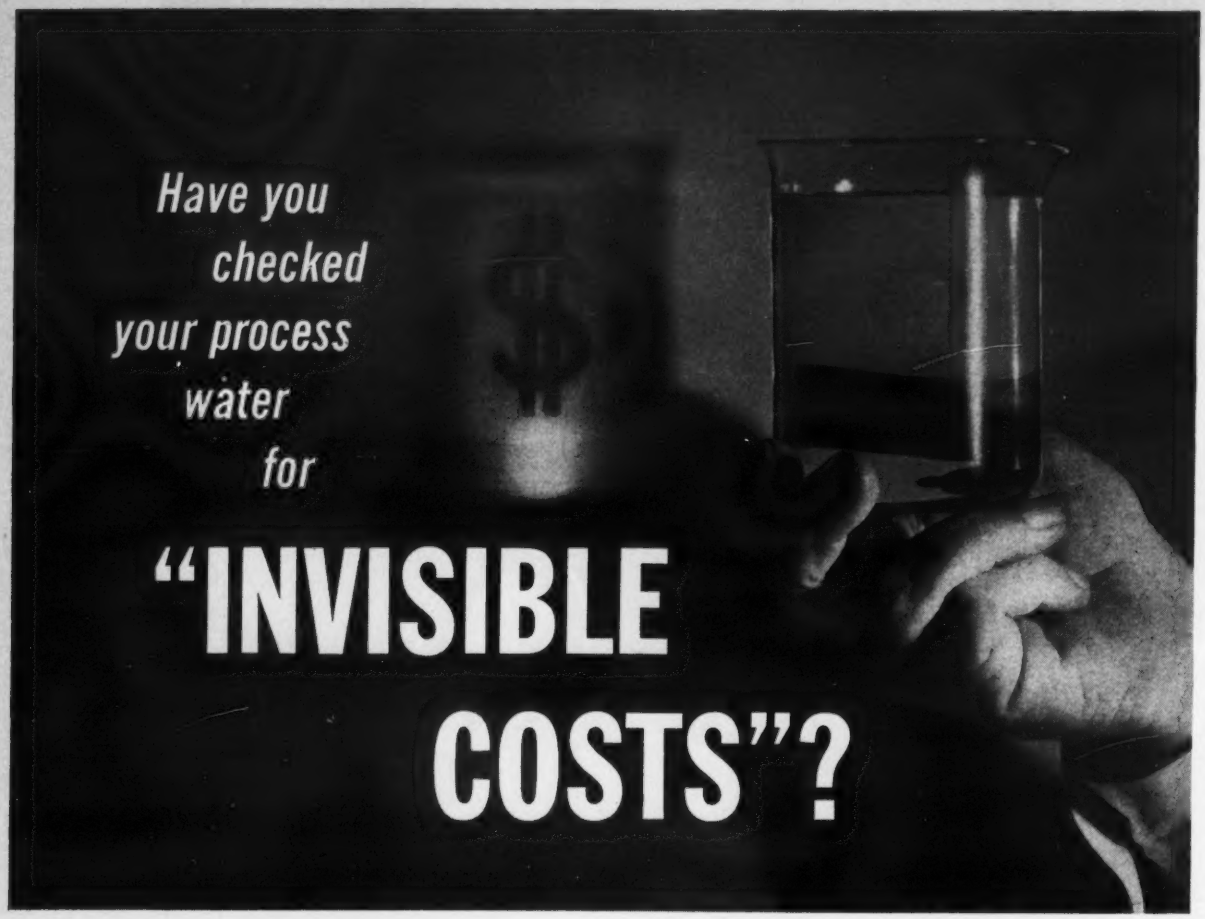
. . . and economy?
Pelletized PE saves materials, storage, and time . . . raises efficiency and cuts cost of your operations.

Is that an order blank you're reaching for?
No, the fan switch. I always get that warm feeling when I talk about our pelletized PE!

Hold that enthusiasm, feller! You still haven't told about the new, continuous process developed by Celanese that gives our pentaerythritol its high purity, nor the extremely low ash content, uniform composition, and virtual absence of formals, acetals, and other organic impurities. And mention the better alkyd resins and coatings, varnishes, and synthetic drying oils our PE makes possible. Celanese Corporation of America, Chemical Division, Dept. 591-S, 180 Madison Avenue, New York 16, N. Y. Celanese®

Canadian Affiliates: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16.

Celanese CHEMICALS



Often unsuspected—and hence ignored—the "invisible costs" in process water can have serious long-term effects. Hence, the growing concern of many engineers—and their discovery that these invisible costs can be sharply reduced by filtration with Dicalite Filteraids.

"INVISIBLE" TURBIDITY Many chemical pretreatments do not remove microscopic solids found even in "clean" water. Since these colloidal particles are usually gelatinous or slimy, as small an amount as 1 ppm can have adverse effects on product quality, on other processing materials such as demineralizers and resins, or on pumps, screens and piping systems. Filtration of the raw water with Dicalite Filteraids can produce a process water which is cleaner, more free of bacteria and algae, than is required for municipal supply.

FUEL COSTS When process water must be heated, it often ends its cycle 80° to 100° warmer than at input. Some plants have found that filtering and recycling this warmer water saves enough in fuel costs to make an actual profit on the filtration.

LOSS OF PROCESS MATERIALS In industries as diverse as metallurgy and papermaking, filtration with Dicalite or with Nerofil (which forms a combustible filtercake) recovers metals values and process materials otherwise lost. Might it not do the same for you?

If you would like to investigate the possibility of cutting the invisible costs in your process water, an experienced Dicalite service engineer will be glad to discuss the problem with you and aid in working out the economics. No obligation, naturally.

Dicalite Bulletin BW-13 is available on request. While it deals primarily with potable water, its information is basic to the entire subject.

Dependable GLC GREAT LAKES Dicalite® FILTERAIDS

DICALITE DEPARTMENT, GREAT LAKES CARBON CORPORATION • 612 SO. FLOWER ST., LOS ANGELES 17, CALIF.

Check 3774 opposite last page.

Surface-to-volume ratio of magnesium silicate exceeds 600 sq m/g

Uses: Adsorbs moisture, gases, most common color and odor-forming bodies, and weak acids and polar compounds.

Features: High surface-to-volume ratio, exceeding 600 sq m/g. It is both adsorptive and selective.

Description: Porous in structure, adsorptive magnesium silicate is finely divided, free-flowing white powder.

Properties include: density, 2.04 gm/cc; refractive index, 1.500-1.515; pores, 630 ml/gm volume and 33 A° average diameter; uniform distribution; and pH of 10% slurry, 7.5-8.5.

It adsorbs water without change in volume; removes weak acids by adsorption, but is dissolved by strong acids; and displaces heavy metal ions in salts. It has no reaction to bases.

When treating liquids, moderately fine form is mixed directly into liquid; then is filtered out, leaving liquid clear and odorless. Extremely fine form is used with powdered products, permitting intimate intermixing.

(AICCO-SOL is product of American Industrial Chemical Company, division of Amerace Corporation, Butler, N.J.)

Check 3775 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Polystyrene-foam bonds last in temp range of −40 to +160°F

In-place, prefoamed types are available

Uses: With foamed-in-place polystyrene (A-827-B) and for bonding pre-foamed polystyrene shapes to themselves, to polystyrene sheet or to

steel, aluminum, transite, and formica (R-1083-T and 800-X-8002).

Features: All bonds are durable in −40 to 160°F range. *A-827-B*—has high strength while in tacky state, permitting fast assembly such as required in production line. Adhesive will not stain materials to be joined.

R-1083-T—adhesive film is free from taste and odor. Solvents present in material will not result in any noticeable stress-crazing of polystyrene if normal application procedure is followed.

800-X-8002—will not produce noticeable stress-crazing when used to bond polystyrene materials. Bonded polystyrene assembly can be made at low temperatures (approximately 120°F) and low pressures (2 or 3 psi).

Description: *A-827-B*—is opaque cream-colored medium-viscosity solvent-type solution adhesive. After application, material will air dry by solvent evaporation to form rigid bond, which possesses some residual tack.

R-1083-T—is pink-colored medium-viscosity solvent-type solution. Adhesive will air dry by solvent evaporation to form rubbery stringy, pressure-sensitive-type bond.

800-X-8002—is tan-colored, thin-viscosity water-dispersed (latex) adhesive, with consistency slightly more viscous than that of water. It will air dry by water evaporation to form flexible bond which possesses some residual tack.

(Adhesives A-827-B, R-1083-T, and 800-X-8002 are products of Adhesives Division, The B. F. Goodrich Company, Akron 18, Ohio.)

Check 3776 opposite last page.

Phosphate compounds and other chemicals are discussed in detail in handy 72-page brochure. Properties and applications of a large number of products are given. Among principal uses of materials described are in chemical processing, cleaning compounds, soaps and detergents, and water treatment. "Blockson Chemicals" — Blockson Chemical Company, Div. of Olin Mathieson Chemical Corp., Joliet, Ill.

Check 3777 opposite last page.

For Coconut Oil Fatty Acids or Methyl Esters, remember...

At El Dorado SERVICE IS FOREMOST
OA 419 FOREMOST EL DORADO
7/1/59 458 PM GA PLS
THIS IS ST LOUIS XYZ URGENT
NEED TANKCAR METHYL LAURATE 96
NO LATER THAN 6 DAYS FROM DATE
SOONER IF POSSIBLE

The time is 3:05 A.M. and all is well. At 5 A.M., twelve hours after the above wire was received at Foremost El Dorado's Oakland, California plant, this tank car loaded with Eldo Methyl Laurate 96 will be rolling.

Four days and 2400 miles later in St. Louis, an anxious Foremost customer will relax. This same tank car will roll to his siding, the seal on the dome will be broken and 8000 gallons of Methyl Laurate will be ready for use . . . a full day ahead of schedule.

This kind of quick service . . . along with strict attention to the *purity* and *uniformity* of product . . . has made Foremost El Dorado a dependable source of coconut oil products for over 65 years.

Let us serve you with the same dependability

Even faster deliveries from Eastern and Mid-Western shipping points. Contact the agent nearest you or write for samples and specifications. Dept. B-1

FOREMOST FOOD AND CHEMICAL COMPANY
P. O. Box 599, Oakland 4, California

FATTY ACIDS			METHYL ESTERS		
Caprylic	Capric	Lauric	Caproate	Caprylate	Caprate
Myristic	Palmitic		Laurate	Myristate	Palmitate
Cocoleic	Eldhyco	Coconut	Oleate	Eldo*18	Coconate
					*T. M. REG.

Atlanta: Geo. E. Missbach & Co.
Boston: N. S. Wilson & Sons
Chicago: M. B. Sweet Company
Cleveland: F. W. Kamin Company
Detroit: Harry Holland & Son, Inc.
Houston: Joe Coulson Company
Kansas City: Vulcan Sales Company
Minneapolis: M. H. Baker Company
New Orleans: Breffeilh & Sheahan Company
New York: H. Reisman Company
Oakland: Foremost Food & Chemical Co.
Oklahoma City: Rullman Brothers
St. Louis: Harry A. Baumstark & Company

Check 3778 opposite last page.

liquid resin 8171

CUTS PRODUCTION TIME...LOWERS FINISHING COSTS

FOR FASTER, MORE UNIFORM CREASE RESISTANT TEXTILE FINISHES

The multiple manpower operations required to handle, measure and mix paste-form crease-resistant finishes are money-consuming and time-wasteful. Furthermore, no batches thus made can compare in uniformity and accuracy with a *used-as-received* liquid formulation.

By turning from pastes to Catalin Resin 8171 . . . (a versatile, water-soluble monomeric LIQUID urea formaldehyde formulation) . . . many large textile finishing plants are now enjoying important production economies, better and more uniform finishes . . . and the sense of satisfaction that comes with saving both time and money!

Catalin Resin 8171 is available only in tank car and tank truck quantities. It readily meets TBL crease-resistance specifications as applied to spun rayon fabrics and blends.

Catalin field representatives, experienced in the processing problems of the textile industry, welcome the opportunity to submit samples and discuss the cost-cutting and quality advantages of Resin 8171. Inquiries invited.

CATALIN CORPORATION OF AMERICA
ONE PARK AVENUE, NEW YORK 16, N. Y.
plants: FORDS, N. J. • THOMASVILLE, N. C. • CALUMET CITY, ILL.

Check 3779 opposite last page.

Injection-molding uses for polyethylene wax

Uses: Injection-molding applications. Also as calender release agent in milling operation of rubber manufacture. In addition, product may be used in small concentration to increase gloss, flexibility and blocking resistance of paraffin wax.

Features: Polyethylene wax has molecular weight on the order of 2500.

Description: Wax is readily soluble in both aliphatic and aromatic hydrocarbons at temperatures above 180°F. Typical properties of wax:

Ring and ball softening point (ASTM D-36-26), °C	103-104
Penetration hardness (100 g/5 sec/77°F), mm	0.3
Acid number	0.1
Saponification number	0.1
Flash point, °F	600
Brookfield viscosity (@ 120°C), cp	360

(Epolene LV is product of Eastman Chemical Products, Subsidiary of Eastman Kodak Company, Kingsport, Tenn.)

Check 3780 opposite last page.

Rigid and pliable foams have low heat transfer

Low degree of heat transfer and water absorption characterize two recently introduced plastic foams. The foams, available in both pliable and rigid forms, are composed of expanded polystyrol crystals.

Properties of rigid type of foam are as follows:

Specific gravity	0.02
Compression strength, psi	16-20
Tensile strength, psi	44.46
Water absorption, % vol	<½
Thermal conductivity Btu/hr/sq ft/°F/in	0.23-0.25

Physical properties of flexible foam are approximately the same, except for weight.

(Plastifoam Flexible 201 and Plastifoam Rigid 101 are products of Plastifoam Corporation, Rockville, Conn.)

Check 3781 opposite last page.

TC INDUSTRIAL CHEMICALS

We mine Copper, Iron, Zinc and Sulfur and are basic producers of their chemical derivatives. Our technical know-how in these basic materials is your assurance of exacting quality control and strict uniform consistency.

COPPER

- Copper Sulfate
- Monohydrated Copper Sulfate
- Copper Carbonate
- Cupric Chloride

SULFUR

- Sulfuric Acid
- Liquid Sulfur Dioxide
- Sodium Hydrosulfite
- Chlorosulfonic Acid
- Para Toluene Sulfonic Acid, Anhydrous

IRON

- Ferric Iron Sulfate

ZINC

- Monohydrated Zinc Sulfate
- Zinc Oxide

MANGANESE

- Manganese Sulfate
- Monohydrated Manganese Sulfate
- Manganous Oxide

For Further Information or Samples, Make Request on Your Firm's Letterhead.

TENNESSEE CORPORATION
615-29 Grant Building, Atlanta 3, Georgia

Check 3782 opposite last page.

ADVERTISEMENT—*This entire page is a paid advertisement* *Prepared by U. S. Industrial Chemicals Co.*

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

U.S.I. Names New Manager For Alcohol, Solvent Sales

Thomas R. Drinkwater has been named Manager of Industrial Alcohol and Solvents Sales for U.S.I., largest marketer of ethyl alcohol in the U.S. In his new position, Mr. Drinkwater succeeds Warren E. Johnson who has just been appointed Director of Chemical Sales.

T. R. Drinkwater

Mr. Drinkwater worked out of the company's Chicago Sales office until 1957 when he was made Assistant to the Manager of Alcohol and Chemical Sales, the position he was holding at the time of this new appointment.

Alcohol Aerosol Formulas Proposed for Gibberellin

Because the remarkable plant growth stimulant, gibberellin, has proven effective in dosages as low as 5-10 micrograms, aerosol dispensing has been suggested as a highly accurate, convenient and economical means of applying the material. Using a meter-type valve designed to release about 100 milligrams of formulation containing about 5 micrograms of stimulant, one 3-ounce aerosol container (2 ounce practical fill) could give more than 500 applications.

Gibberellin is said to lose its effectiveness gradually in water solutions, and consequently all formulas which have been suggested for the material have been nonaqueous. The following composition for packaging in glass has been proposed:

Gibberellin	0.00625 wt. %
Surfactant	0.200
S.D. Alcohol #40, anhyd.—q.s.	50.00
Propellant	50.00

This composition is among those recommended for packaging in lacquer-lined metal:

Gibberellin	0.00625 wt. %
Surfactant	0.2
S.D. Alcohol #40, anhyd.—q.s.	20.0
Propellant	80.0

Polyethylene Used for New Box-Type Mixer-Settler

The recently-reported development of a polyethylene, box-type, mixer-settler extractor — one of the first complex pieces of process equipment made almost entirely of polyethylene — points the way to still greater utilization of this tough, corrosion-resistant plastic as a material of construction for the Chemical Process Industries.

This piece of equipment was designed to handle corrosive chemicals used in the separation of materials by liquid-liquid extraction. It is a horizontal contactor in the form of a rectangular box about nine inches high. The box is divided into sections, each of which handles a stage in the extraction process. Each section contains a mixing chamber suspended in an antechamber, and a settling

MORE

U.S.I. Completes Million-Gallon Concrete Storage Tank for Phosphatic Fertilizer Solutions

One of Largest Ever Built for Phosphoric Acid Storage, Tank Holds 1½-Month's Plant Production, Is Designed To Increase Supply to Fertilizer Formulators

An innovation in phosphoric acid storage tanks — a reinforced concrete structure with a capacity of over a million gallons of phosphatic fertilizer solution — has just been completed at Tuscola, Illinois, site of U.S.I.'s wet-process phosphoric acid plant. This 100 ton-per-day plant serves fertilizer formulators in a 12-state area, and operates under the usual seasonal demand conditions of the agricultural chemicals field.

When the outsized storage tank goes into service this month, it will help smooth out the supply-demand curve both for U.S.I. and for the formulators served by the company. The tank will increase the plant's storage capacity by 1½ months' production, insuring formulators of a steady supply of raw material for their late winter and early spring compounding season.

The tank, built by the Preload Company, Inc. of New York, is one of the largest ever constructed for phosphoric acid storage, measuring 100 feet in diameter by 21½ feet high. It is made of reinforced concrete which was built up in place on a wire mesh form and pre-stressed in the construction. This is an innovation in tank design, since most phosphoric acid storage is in lined steel tanks.

Phosphoric as Fertilizer Material

While wet-process phosphoric acid has been an intermediate in triple superphosphate production for many years, its use as a raw material for mixed fertilizer generally dates back only to 1957. That use is growing rapidly for a number of reasons: It is the only commercial source of P_2O_5 in liquid form, which eliminates dusting and the problems of handling solids. It is by far the most highly acid

MORE

Sodium Borohydride Is Key To New Vinyl Foam Process

A new process for making vinyl foams has been developed, using sodium borohydride as the blowing agent. It is claimed that the new method yields a product with fine, uniform cell structure, low density and low compression set — using simple equipment and techniques. In addition, the process is said to permit the molding of small, intricate shapes unobtainable previously with vinyl foams.

Sodium borohydride, reacted with water in a mildly acid medium, gives sodium borate and hydrogen gas. The gas does the blowing and foaming. Control of the foam depends on the treatment of the borohydride before it is incorporated into the plastisol, and on the choice of activator promoting decomposition.

Heat and plasticizer viscosity are claimed to have no effect on cell size, eliminating the need for foam or heat stabilizers. Ultimate foam density depends only on borohydride concentration, which runs about 0.4%. Foams can be formed at room temperature or above. Setting, on the other hand, requires a 350°F temperature. When the plastisol expands at room temperature, cell structure is said to remain unchanged through the fuse and cool cycle.

Sodium borohydride is made by reacting hydrogen gas with metallic sodium dispersed in mineral oil to form sodium hydride, and then reacting this compound with methyl borate.

Mid-June construction photo of U.S.I.'s million gallon phosphoric acid storage tank.

★ U.S.I. CHEMICAL NEWS ★

CONTINUED *Storage Tank*

source, and the most concentrated source (52-54%), of P_2O_5 available commercially. Finally, it can be a very economical source of P_2O_5, depending on location.

Because of these characteristics, wet-process phosphoric acid offers fertilizer formulators several important advantages: large quantities of ammonia can be neutralized, because of the high acidity characteristic. High analysis grades can be formulated because of the high concentration characteristic. And for granular goods, this raw material gives rugged granules, well suited to subsequent handling, without the addition of granulation aids.

Now, with the addition of large-scale storage facilities, the U.S.I. plant at Tuscola will be better able to handle the growing demand for this economical raw material by formulators in its market area.

CONTINUED *Polyethylene Extractor*

chamber. Underflow and overflow ports connect the sections, for flow from stage to stage.

The box — and the partitions which separate the sections and the settling and antechambers within the sections — are made of polyethylene sheets. Each side of the box is one piece, as is the entire bottom. After assembly of box and partitions, all joints were reinforced and made water-tight by welding with molten polyethylene.

Mixing chambers are made from polyethylene cups, and polyethylene tubes welded to these cups act as inlets and outlets. Each mixing chamber contains an impeller assembly, consisting of saran mounting plate, stainless steel bearing, polyethylene-coated stainless steel shaft and a polyethylene impeller.

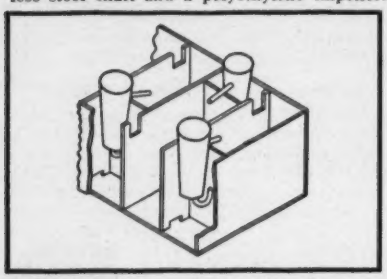


Diagram courtesy Iowa State College, Ames, Ia.

Three U.S.I. Sales Offices Get New Managers

E. RICHARDSON

Edward C. Richardson has been appointed U.S.I. Chicago Sales Division Manager, succeeding George H. Stanton who has been named Director of Field Sales for the company. Mr. Richardson has been Sales Division Manager for U.S.I.'s Boston office since 1950. He has been with the company's sales organization since 1940.

J. HALLOWELL

Jesse H. Hallowell succeeds Mr. Richardson as U.S.I. Boston Sales Division Manager. He has been with the company since 1953, first at the Tuscola, Ill. plant and most recently at the Chicago Sales office.

J. PUTNAM

John A. Putnam, formerly U.S.I. salesman in the Atlanta, Ga. area, has been promoted to Manager of U.S.I.'s Atlanta office.

ATTENTION: Users Of Industrial Alcohol

As of July 1, 1959, a carrier permit is no longer required to transport tax-free, specially denatured and undenatured alcohol, including tax-free distilled spirits. For many years the Internal Revenue Code, and regulations issued under it, required a permit for such transport. The Excise Tax Technical Changes Act of 1958 (Public Law 85-859) which went into effect July 1, 1959 revoked the statutory requirement for permits.

As of the close of business on June 30, the assistant regional commissioners automatically terminated all outstanding bonds covering carrier activities. No further action is required by carriers.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Deodorant for industrial use, said to be odorless and to control residual odors without paralyzing olefactory nerves or masking, is now on market. Identified as quaternary ammonium compound, material has been used in hospitals, found to inhibit mold, mildew growth. **No. 1500**

Carbon wool — pure carbon in fiber form — can now be obtained in 6 standard types plus special grades. Said to have unusual combination of properties: low ash, color and sound absorption, heat resistance, inertness. **No. 1501**

Boron trifluoride neutron detectors, in wide range of sizes and several cathode materials, are now available. Detect slow neutrons by $B^{10}(n,\alpha)$ reaction. Can also detect fast neutrons by using moderators around detectors. **No. 1502**

Crystalline DL-glyceraldehyde 3-phosphate diethylacetal (GAP) now available in research quantities. Can be converted to DL-glyceraldehyde 3-phosphate, important in metabolism, respiration, fermentation, energy transfer. **No. 1503**

Booklet of conversion tables for metric and U.S. customary units of length, weight and volume can now be purchased. Contains conversions: mm-in., cm-ft., m-yd., g-avoir oz., kg-avoir lb., troy oz.-g, ml-fl. oz., l-US gal. **No. 1504**

New hydrazine flux for soldering electrical and electronic equipment is said to leave no rosin residue which is costly to remove; to be noncorrosive, insuring corrosion-free joints; to permit prefluxing. **No. 1505**

New adhesive for adhering paper labels to polyethylene containers has been developed. Claimed to form permanent flexible bond with all polyethylene surfaces and be be fast-grabbing, with good shock resistance and aging qualities. **No. 1506**

Silicones and their uses are covered in new catalog. Uses described include: rubber products, cosmetics, polishes, electrical insulation, water repellents, textile finishes, lubricants, release and antifoam agents. **No. 1507**

Newly-formed abstracting service supplies, at a charge, technical abstracts on drugs, cosmetics, toiletries, foods, plastics, paints and advertising. Abstracts supplied on index cards. **No. 1508**

Industrial fatty acids — their chemistry, production, processing and applications — are covered in comprehensive new 250-page book which can be purchased. Important commercial derivatives are also discussed. **No. 1509**

PRODUCTS OF U.S.I.

HEAVY CHEMICALS

Phosphatic Fertilizer Solutions: wet process phosphoric acid.
Ammonia, Anhydrous: commercial & refrigeration. Tank cars or tank wagons.
Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions
Sulfuric Acid: all strengths, 60 Baume to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank wagons.
Caustic Soda, Chlorine
Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.
Sodium Peroxide

OTHER PRODUCTS

PETROTHENE® Polyethylene Resins
Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.
Alcohols: Ethyl (pure and all denatured formulas); Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL PR.
Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.
Animal Feed Products: Antibiotic Feed Supplements, Calcium Pantothenate, Choline Chloride, Special Liquid CURBAY, Menadione (Vitamin K_3), DL-Methionine, MOREA® Premix, Riboflavin Products, U.S.I. Permadry, Vitamin B_{12} Feed Supplements, Vitamin D_3.

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Tall-oil-based amine trio is now available commercially

For flotation of ores—as chemical intermediates

Uses: Flotation of silica from phosphate concentrates (Delamin X); flotation of potash from sylvinite, synthesis of compounds for use in fields of pharmaceuticals, insecticides, disinfectants, and preservatives (Delamin P and PD).

Features:

Delamin X — is comprised of both resin and fatty amines. This combination reportedly gives optimum metallurgical results in phosphate beneficiation at reasonable cost.

Delamin P and PD — all fatty amines with strong cationic properties.

Description: The three fatty amines are available commercially. Delamin P results from processing of fatty-acid portion of tall oil. Delamin PD is high-purity distilled form. Third amine, Delamin X, is mixed resin-fatty amine, corresponding to processing of whole tall oil.

Analysis of total amine composition of P and PD types is as follows:

	Delamin	
Amine	P	PD
Oleylamine, %	50-60	40-45
Stearylamine, %	35-40	55-59
Linoleylamine, %	3-5	<1-1

Properties of the three amines are listed below:

	Delamin		
	X	P	PD
Nitrogen, %	4.65	4.77	4.98
Viscosity @ 158°F (Brookfield), cps	9.6	5	5
Density @ 77°F	0.96	0.87	0.87
Flash Point (COC), °F	392-97	367	354
Amine content, %:			
Total	90	90	96
Primary	84	85	95
Secondary	6	5	1

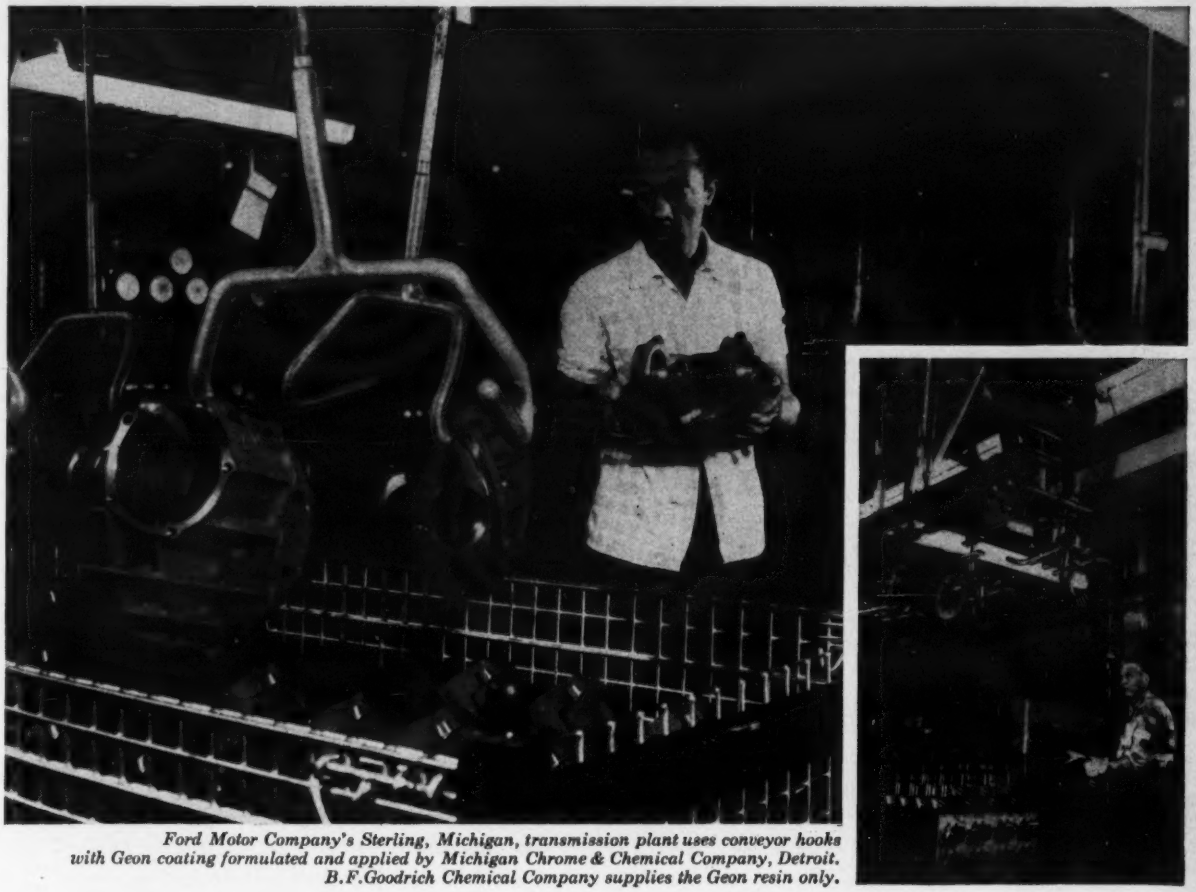
(Delamin P, PD, and X are products of Hercules Powder Company, Incorporated, Wilmington 99, Del.)

Check 3783 opposite last page.

For more information on product at left, specify 3784 . . . see information request blank opposite last page.

Another new development using

B.F.Goodrich Chemical *raw materials*



Ford Motor Company's Sterling, Michigan, transmission plant uses conveyor hooks with Geon coating formulated and applied by Michigan Chrome & Chemical Company, Detroit. B.F.Goodrich Chemical Company supplies the Geon resin only.

"Soft touch" of Geon safeguards parts quality

The overhead conveyor system in this automatic transmission plant uses 26,000 hooks coated with Geon polyvinyl material. The soft yet durable coating made from Geon protects finished parts while they are carried from machining to assembly stations.

In addition to giving the hooks a long and profitable service life, the Geon coatings come in any color, permitting color-coding for multiple conveyor operations.

Versatile Geon is ideal for many coating applications, since it disperses readily in the coating formula. Geon can be used to coat paper, textiles, metals or almost any material to provide new or improved advantages. Hundreds of types of Geon resins, plastics, latices and polyblends are available, tailored to specific uses for coatings, moldings, extrusions, or rigid or foam applications. For information, write Dept. AL-7, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

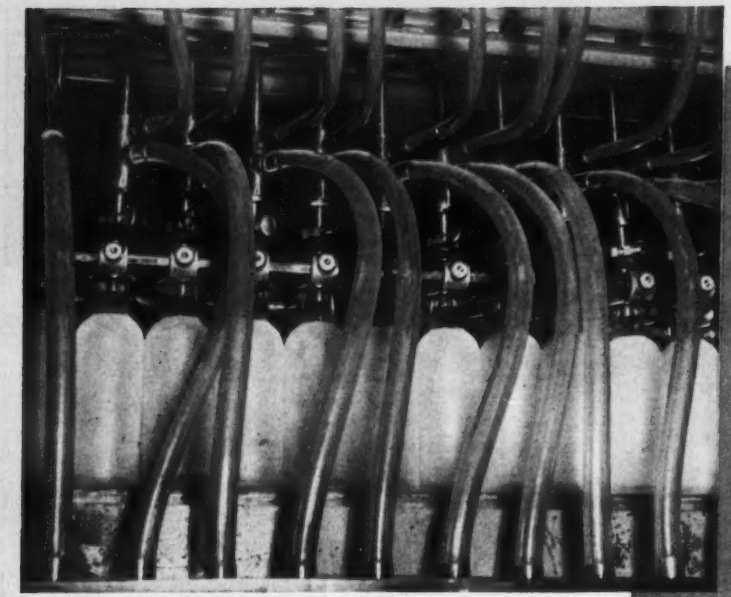
B.F.Goodrich

GEON polyvinyl materials • HYCAR rubber and latex
GOOD-RITE chemicals and plasticizers • HARMON colors

Check 3785 opposite last page.

TYGON® *plastic* TUBING

can be particularly helpful



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- HANDLE CORROSIVE LIQUIDS OR GASES
- TRANSMIT FOODS, DRUGS, BEVERAGES OR OTHER HIGH PURITY AND/OR SENSITIVE SOLUTIONS
- FACE SPACE LIMITATIONS
- REQUIRE VISUAL INSPECTION AND CONTROL OF FLOW

Tough, flexible Tygon plastic Tubing is resistant to an extremely broad range of corrosive gases and chemicals. In fact, it is the standard tubing in laboratories throughout the world, handling virtually all chemicals normally encountered. Clear as glass, it provides perfect visibility of flow.

In non-toxic, odorless and tasteless formulations, Tygon Tubing is almost universally the preferred plastic for handling milk, beverages and liquid or semi-solid dairy products.

Flexible as a piece of string, available in continuous lengths, Tygon Tubing requires few joints or couplings, is quickly installed in minimum space. Its highly-polished bore provides outstanding flow characteristics, prevents interior build-up, permits simple flush-cleaning. Non-aging and physically tough, Tygon retains its unique combination of advantages throughout a long, trouble-free service life.

One of seven standard Tygon formulations will almost certainly meet your requirements. Special formulations have been developed for unusual needs. Over 65 standard sizes up to 4" I.D. are available.

441-F

Get complete technical data on the various Tygon Tubing formulations, as well as other helpful information. Write today for free Bulletin T-97.

PLASTICS & SYNTHETICS DIVISION

OUR 100th YEAR

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AKRON 9, OHIO

Check 3786 opposite last page.

Textile-processing wax strengthens fabrics

Uses: As softener and plasticizer in textile wet processing.

Features: Increases tear strength, abrasion resistance, and crease recovery in wash-wear fabrics. As softener and plasticizer, imparts slickness to warps for increased weaving efficiency.

Description: Nonionic, antistatic, chemically reacted microcrystalline material is modified by special process to accentuate softening and plasticizing properties. Supplied as cream- to white-colored emulsion, it can be diluted with water at room temperature to desired concentration.

Wax is compatible with commercial resins and catalysts, and stable to acids, alkalis, and salts. Resistant to yellowing at elevated temperatures, oxidation and odor development, it will not contribute to chlorine retention. It may be used alone as top finish.

(Sonowax 3450 is product of Textile Chemicals Division, L. Sonneborn Sons, Inc., 300 Fourth Ave., New York 10, New York.)

Check 3787 opposite last page.

Stable potassium salt good chlorine source

Uses: Chlorine source for dry bleach and sanitizing agents.

Features: Acid has high solubility and rapid rate of solution. These characteristics lengthen shelf life and reduce container costs. Potassium salt is as functional as other sources of available chlorine.

Also, it is stable, odor-free, and readily compatible with other ingredients or typical formulations.

Description: Product is potassium salt of dichloroisocyanuric acid.

(ACL-59 is product of Monsanto Chemical Company, 800 N. Lindbergh Blvd., St. Louis 66, Mo.)

Check 3788 opposite last page.

BUILD SPECIAL PROPERTIES INTO "TAILOR-MADE" POLYMERS WITH VINYLPYRROLIDONE

CONTROLLED SOLUBILITY
DYE RECEPTIVITY
EMULSIFICATION
SURFACE ACTIVITY
ADHESIVENESS
STRENGTH
COMPLEXING ACTION

These are some of the many properties which may be "built into" copolymers to meet specific needs.

Vinylpyrrolidone, a versatile liquid monomer, copolymerizes readily with other monomers. Vinylpyrrolidone also reacts with phenols to form valuable addition compounds.

Vinylpyrrolidone offers a new approach to a wide variety of polymeric products, including synthetic fibers and films, lube oil additives, adhesives, coatings and finishes, glass-fiber laminating resins, and textile sizes. If you work with copolymer systems, see what Vinylpyrrolidone can mean toward product improvement.

For additional information on handling properties, copolymerization procedures, etc., write for Bulletin No. AP-36.

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MEMPHIS • LOS ANGELES

Check 3790 opposite last page.

Injection-molding holds strength at 10°F

Uses: Injection-molding applications.

Features: At 10°F cans fabricated from material withstood 6′ dropping tests without shattering.

Description: Polyethylene-copolymer molding compound has broad molding latitude and exhibits high rigidity.

(DPD-7365 polyethylene-copolymer molding compound is product of Union Carbide Plastics Company, Division of Union Carbide Corporation, 420 Lexington Ave., New York 17, N. Y.)

Check 3791 opposite last page.

Low-viscosity epoxies provide protection

Uses: Potting and encapsulating transformers, capacitors, resistors, and other electrical and electronic devices.

Features: Thermosetting compounds exhibit good electrical, physical, and chemical properties. They are effective in protecting equipment against moisture, solvents, mechanical shock, and severe temperature changes.

Description: Low-viscosity epoxy liquids can be cured without heat or pressure. They exhibit low shrinkage. One compound (501) is low-viscosity rigid general-purpose potting and encapsulating compound. Second (502) is high-impact-resistant potting material. It is particularly suitable for applications involving temperature cycling and high mechanical shock.

(Cepox 501 and 502 are products of Chemical Development Corporation, Danvers, Mass.)

Check 3792 opposite last page.

Four industrial adsorbents are presented in 16-page booklet. Sample packets of activated clay, all purpose fuller's earth, natural bleaching clay and activated bauxite are included in Industrial Adsorbents Booklet — The Milwhite Co., Inc., 5800 Lyons St., Houston, Texas.

Check 3793 opposite last page.

Developing a new household product?

*Give it a selling fragrance with ODRENES**

Right now—at the development stage—is the time to plan the odor of your household product.

And you'll save time, trouble and expense if you use an ODRENE. ODRENES are a series of fragrances scientifically compounded to solve the odor problems of household products. They are easy and economical to use—and available in a wide range of consumer-tested odor types. Each type is extremely versatile—readily adaptable to the special requirements of the product in which it is to be used.

Samples of ODRENES are available on request. And our technical staff—pioneer in the field of aromatics—offers you full cooperation in their use.

**Odrene is the registered trade-mark for Sindar's series of fragrant additives.*

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For CARBON DIOXIDE

LIQUID, GAS, DRY ICE

65 conveniently located CO_2 Supply Depots and fleets of trucks and rail tank cars insure reliable service and supply.

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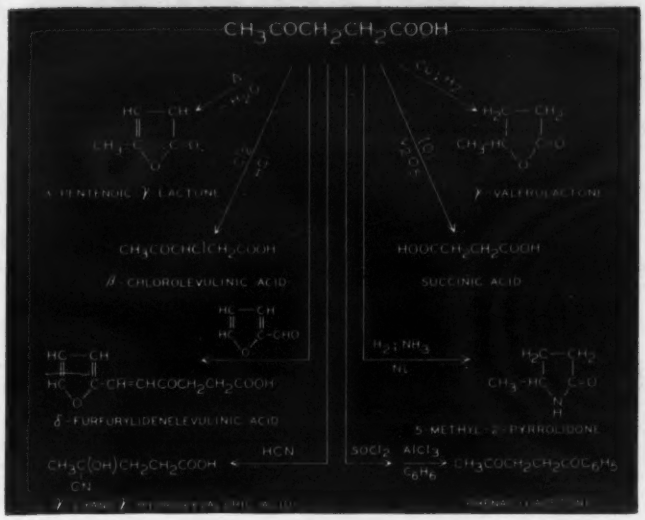


Typical reactions of levulinic acid

Polyfunctional levulinic acid, a review paper on organo-phosphorus bonds, and a $5000 "broom closet" take the stage as . . .

Phosphorus-containing levulinates prove lucrative

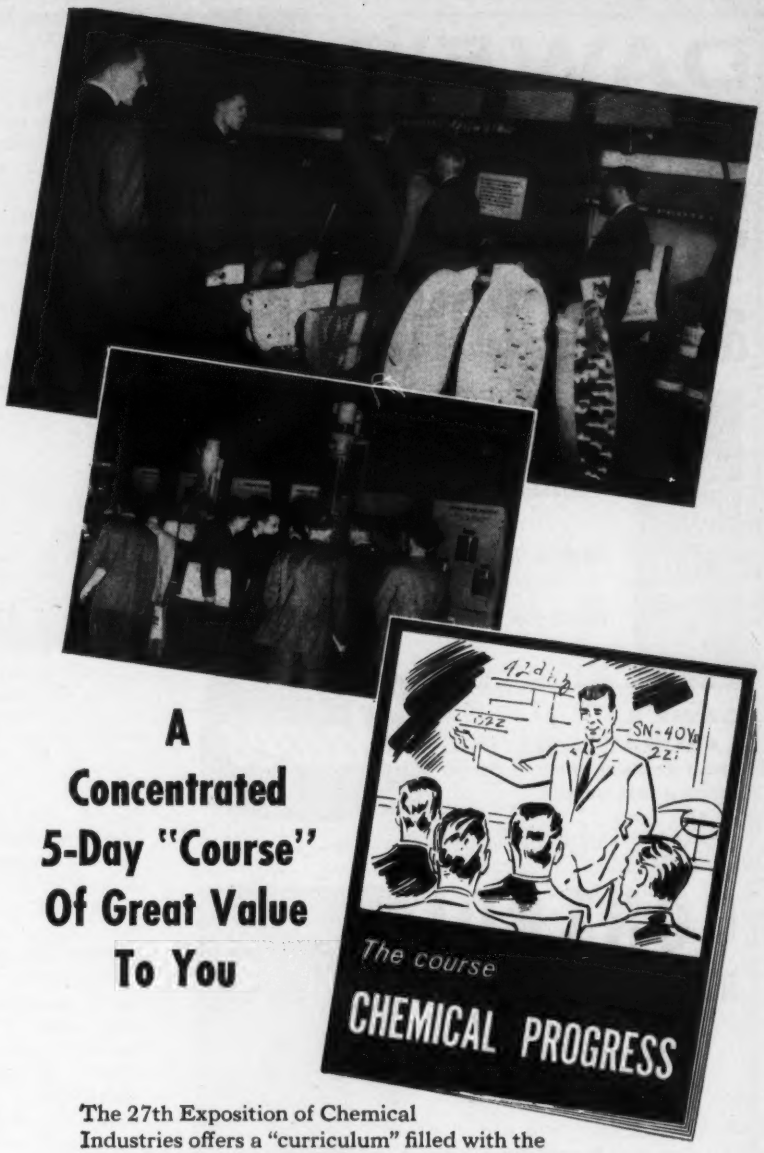
Interest in organo-phosphorus compounds, coupled with time available while waiting for laboratory facilities, proved a valuable combination for Dr. John T. Yoke III. His entry in a recent contest covering potential applications for levulinic acid won first prize of $5000.

An assistant professor of chemistry, Dr. Yoke was reviewing earlier work done on organo-phosphorus bonds for a review paper while waiting for a store room ("little larger than a broom closet") to be converted into laboratory facilities. Since a portion of the review covered derivatives of ketonic compounds, it was a natural step to suggest this use of levulinic as a contest entry.

He outlined potential uses of phosphorus-containing molecules as chelating agents, solvents, gasoline additives, surface-active agents, and others. Although actual derivatives have not been disclosed, market potentials are being actively investigated by the contest sponsor, The Quaker Oats Co.

Levulinic acid (gamma-ketovaleric acid) is a straw-colored liquid having a freezing point at about room temperature (35°C), a boiling point of 245°C, and a specific gravity of 1.15. It reacts as a carboxylic acid, and as a ketone. Because of the spatial relationship of these two groups, many reactions proceed, with cyclization, to form heterocyclics. Also, hydrogen atoms situated alpha to a carbonyl group exhibit condensation and other typical reactions.

Levulinic acid can be produced from a number of hexoses, making starch, sugars, carbohydrates, and celulose possible raw materials. Capacity of semiworks plant is



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Wherever you fit on the chemical processing team—management, design, production, research—a visit to this exposition will stimulate new ideas and fresh approaches to your everyday problems. *Just one idea* picked up here may solve a problem or bottleneck you are facing right now.

Plan now to attend—and bring your key associates with you. This small investment of time will pay future dividends for you and your company.

27th EXPOSITION OF CHEMICAL INDUSTRIES
N. Y. COLISEUM · NOV. 30—DEC. 4.
Management: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Check 3796 opposite last page.

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Write for technical data and samples.

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CONTROL AIR POLLUTION!

FREE BROCHURE TELLS YOU HOW

Now learn how you can clean up combustible pollutants, fumes and odors from your processes. An Oxy-Catalyst System can be engineered to your special requirements. Catalytic oxidation is the most effective air pollution control and waste heat recovery method ever developed! Installation often leads to actual fuel savings. Investigate! Send today for brochure, "Oxycat Systems"—packed with facts and figures on typical industrial installations. Mail coupon below.

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OXY-CATALYST, INC. Wayne 7, Pa., U.S.A.
Catalysts for fume and odor elimination, air pollution control and waste heat recovery

Send me free brochure, "Oxycat Systems"

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Firm_____
Street_____
City_____ Zone_____ State_____

Check 3798 opposite last page.

300,000 lb/yr, with current production priced at $1.00/lb. Projected price for full-scale commercial production is $0.25/lb.

A number of interesting products have already been prepared using levulinic acid as a raw material. These include gamma-valerolactone, a solvent for dyes and other products; diphenolic acid, similar in reaction to bis-phenol A (see CHEMICAL PROCESSING April 1959, page 57); methyl pyrrolidone; succinic acid; and calcium levulinate.

Colin S. Gordon, Quaker Oats executive vice president, presents the $5000 first prize check to Dr. Yoke, winner of the levulinic acid "Big Idea" contest

Production facilities have been available for levulinic acid since 1954. Quaker Oats found themselves with an economic process, a fair-sized plant, and no immediate large-scale market. Contest was conceived primarily to draw to the attention of as many technical people as possible the reactivity and use potential of levulinic acid. In addition, useful ideas would be available for further exploration.

Over 250 qualified entries were judged, ranging in scope from applications in color photography and solar energy to derivatives for food for man in space. Entrants were predominantly in educational fields, probably because employer's disclosure permission was necessary on industrial entries.

(For more information on levulinic acid contact Chemicals Div., Quaker Oats Company, 336 The Merchandise Mart, Chicago 54, Ill.)

Check 3799 opposite last page.

Sicon®

HEAT RESISTANT FINISH

PROTECTS ENGINE SHROUDS OF THE

MARTIN MATADOR

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Sicon's ability to withstand high temperatures up to 1000°F. without breakdown has won an enviable name for itself in the aircraft industry, as well as in many others.

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NEW 72-page GAGE and CONTROL Catalog

..tells where to use them..

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Illustrates instruments and gages...*diagrams* their installation and on-the-job use... *charts* valuable performance data.

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Check 3801 opposite last page.

Magnesium hydroxide in 60% concentration is available

Uses: Chemical-intermediate application as raw material for magnesium-base pulping in paper industry, including magnefite process.

Features: Product is available in 60% concentration. This is reportedly first time such a concentration, which maintains pumpable consistency, has been produced commercially.

Description: Magnesium hydroxide is fluid, stable suspension which lends itself to tank-car shipment.

(Magnesium hydroxide is product of The Dow Chemical Company, Midland, Mich.)

Check 3802 opposite last page.

Cationic softening pair for resins and fibers

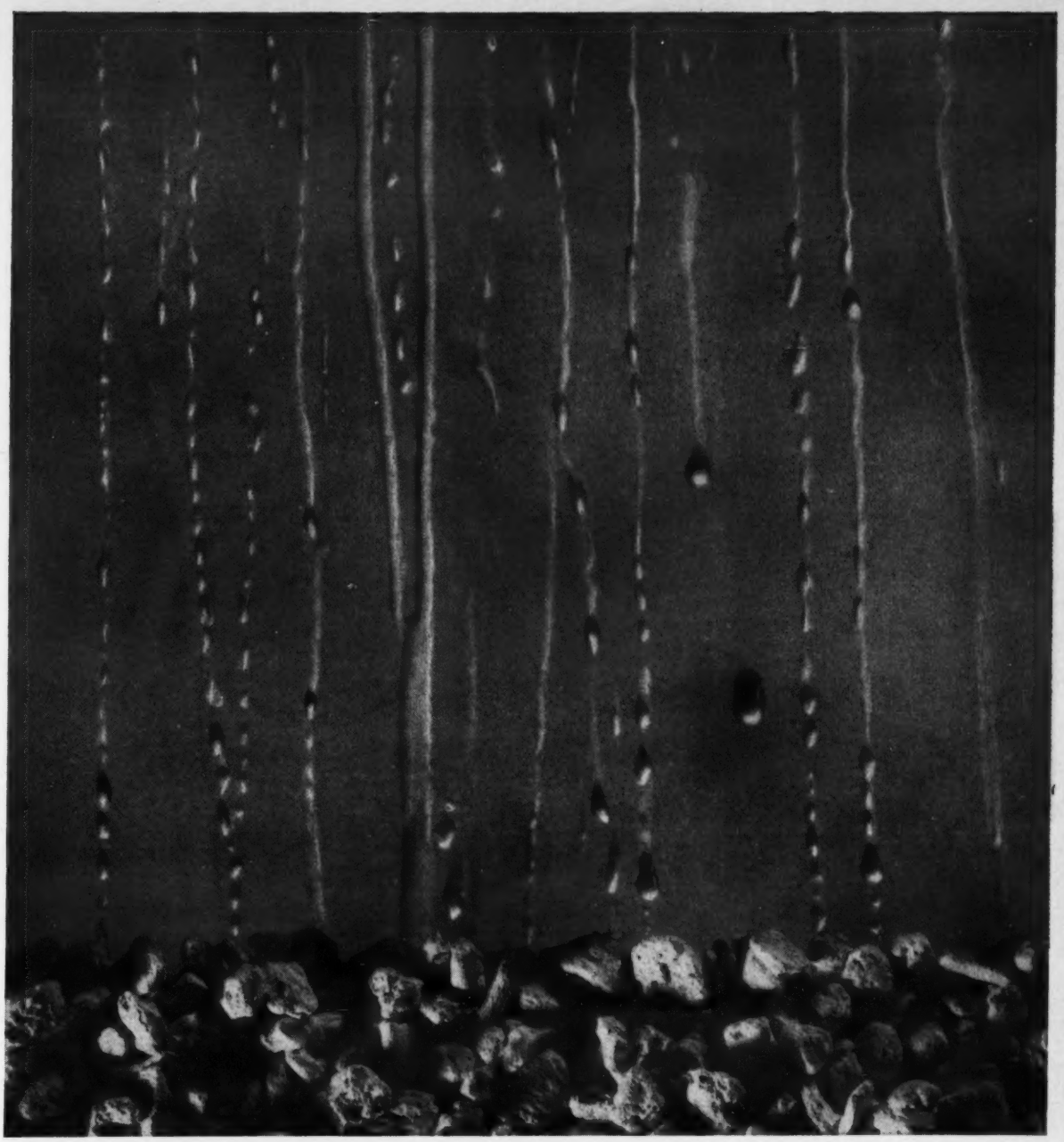
Two cationic softening agents have been developed for use in thermosetting resin finishes (XP) and on wool, silk, and various fibers (RO).

First gives good bath stability. Finishes produced with it possess good resistance to yellowing from heat with no tendency to develop odor. Second also is resistant to yellowing from heat and is compatible with finishing agents.

(Atcosoft RO and XP are products of Metro-Atlantic, Inc., Centredale 11, R.I.)

Check 3803 opposite last page.

"Don't drink any that's in the green bottle."



Unwanted water may ruin your product or process unless you

mix imagination with Alcoa Activated Aluminas

Water you can't remove is a sure bet to destroy the efficiency of a process or the quality of a product, or corrode the equipment. But you can count on drying up the last drop of unwanted water when you mix imagination and engineering with ALCOA® Activated Alumina. Here is the oldest, most thoroughly proved drying agent available. It makes possible dew points to minus 100°F and below. And because it can be saturated and reactivated almost endlessly without loss of capacity, it cuts drying costs substantially. See how quickly it can solve *your* dehydration problems. You'll join the thousands who've discovered it pays to *mix imagination with Alcoa Aluminas . . . to make a new product or process possible, an old product or process better.* To get product details, outline your desiccant application in a letter to ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 707-J Alcoa Building, Pittsburgh 19, Pennsylvania.

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ALCOA CHEMICALS
ALUMINUM COMPANY OF AMERICA

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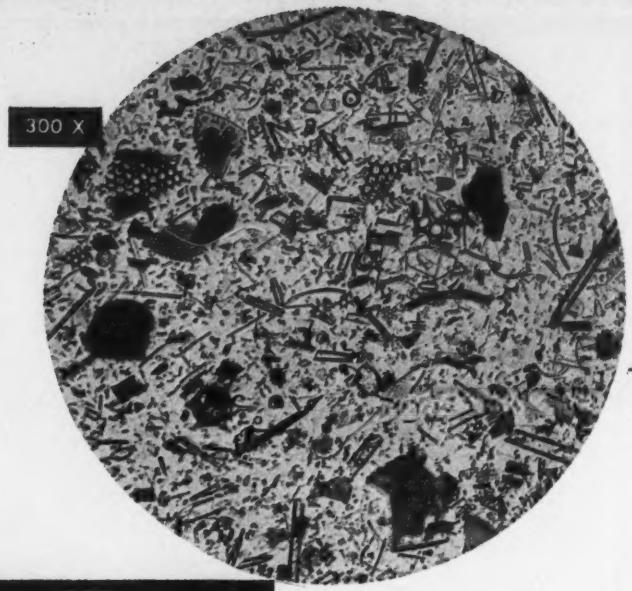
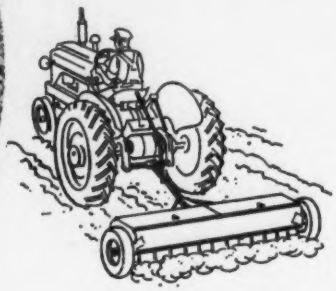
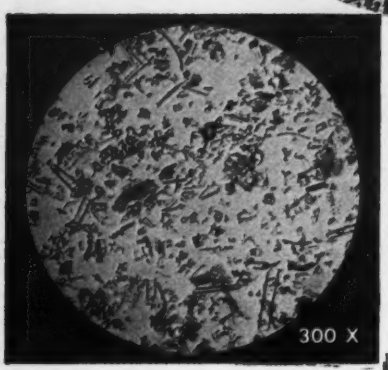
Check 3804 opposite last page.

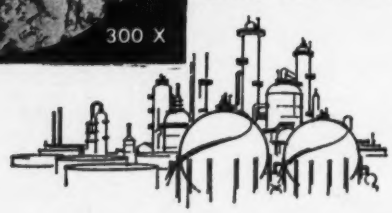


For fertilizer coating—Celite 379, a natural milled diatomite, provides the uniform conditioning needed to prevent caking of granular, mixed or prilled fertilizers—maintains good free-flow characteristics even after prolonged storage.

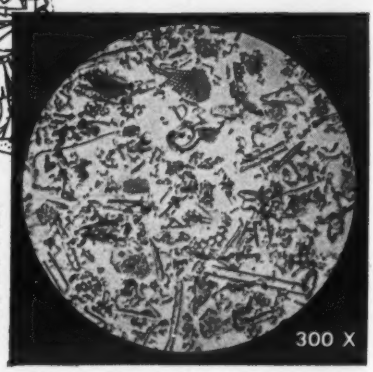




For catalyst carriers—Super Floss, finest particle size flux-calcined Celite grade, is used where a non-reactive porous silica support is needed. (Also available: special Celite supports in many preformed shapes for strength, high temperature stability, resistance to abrasion and attrition.)



As a paint-flatting agent—Celite 281, air-floated fines of flux-calcined diatomite, provides uniform and efficient flatting at low cost. Contributes to control of low angular sheen, durability, and faster drying.



In diatomites, Johns-Manville precision processing works for you

Celite diatomite absorbs its own weight of liquid . . . yet stays 'dry'

No matter which of the many available grades you choose, you can depend on a given volume of inert Celite* to retain its typical dry-powder characteristics even after absorbing its own weight of liquid.

Actually, Celite can absorb a total of more than twice its own weight. That's because a mass of the fine skeletal particles is approximately 93% air space or voids. Yet, in spite of this very high porosity, Celite is essentially non-hygroscopic.

Other unique properties—extremely high bulk, irregular particle shape and large available surface area—ideally suit Celite to hundreds of mineral filler applications. It is produced with precision from the world's purest commercially available diatomite deposit. It offers a wide choice of grades, each carefully controlled for complete uniformity.

For technical data on specific mineral filler or filtration problems, talk to your nearby Celite engineer. Or write to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trademark for its diatomaceous silica products

JOHNS-MANVILLE

JOHNS-MANVILLE JM PRODUCTS

Check 3805 opposite last page.

Low volatility, extraction in polymeric plasticizer

Uses: Plasticizer applications. Product lends permanence to vinyl compounds that would also be resistant to migration into lacquers, varnishes and polystyrene.

Features: Plasticizer has low volatility and good resistance to extraction by water, soapy water, oil, and gasoline.

Description: Polymeric plasticizer, in 24-hr test @90°C, exhibited 0.45% carbon volatility. Vinyl stock used was 2" circle, 0.015" thick. Physical properties of product are as follows:

Color (Gardner), max	5
Acid value, max	2
Iodine value, max	2
Specific gravity, @ 25/25°C	1.08 ± 0.003
Viscosity (@ 210°F), cts	185 ± 5
Refractive index	1.466

(Harflex 330 is product of Harchem Division, Wallace & Tiernan Inc., 25 Main St., Belleville 9, N. J.)

Check 3806 opposite last page.

Resin decay prevented, fume control offered with copolymer

Latest modification uses dispersion in alcohol

Uses: Controlling free formaldehyde fumes arising from urea- and melamine-formaldehyde resins, as well as triazone resins such as are used in paper and particle-board industries.

Features: Stabilizes resin system against adverse temperature and humidity conditions, thus preventing hydrolytic decomposition, without affecting other properties of finished paper or board. Offers fume control, eliminating employee discomfort.

Description: Copolymer is resinous system, devoid of amine groupings, but receptive to copolymerization with excess and free-end formaldehyde. Solution dispersion in

alcohol (anhydrous hydrocarbon solution for anhydrous resins) is utilized.

It contains formaldehyde reactive resins, up to 35-45% of concentrate marketed to mills, and acts to buffer pH of resin baths or solutions before and after application and cure.

(Poly-Coupler X353 is a product of Paper and Plywood Division, Textile Adjuncts Corp., 876 Pacific St., Brooklyn 38, New York.)

Check 3807 opposite last page.

Latex, butyl compounding aided by accelerators

Five rubber vulcanization accelerators have recently been made available. The accelerators have particular application in latex and butyl compounding. Two ultra accelerators, zinc dibutyldithiocarbamate (Cyzate B) and zinc diethyldithiocarbamate (Cyzate E), are water dispersions containing 50% solids.

Thiazole accelerator, zinc mercaptobenzothiazole (ZMBT), comes vacuum packed and palletized. Two other ultra accelerators, monosulfide (Cyuram MS) and disulfide (Cyuram DS) are available in both powder and pellet form.

(Cyzate B and E, Cyuram DS and MS, and ZMBT are products of Rubber Chemicals Department, American Cyanamid Company, Bound Brook, New Jersey.)

Check 3808 opposite last page.

Plasticizer, which is stabilized chlorinated ester of a fatty acid, for use in formulating polyvinyl chlorides, is introduced in MPS-500 Bul — Hooker Chemical Corporation, 509 47th St., Niagara Falls, N.Y.

Check 3809 opposite last page.

Vinyl-acrylic copolymer for flexible-film lamination and pressure-sensitive adhesive formulations is introduced in Resyn® 26-2404 Bul—National Corporation, 750 Third Ave., New York 17, N.Y.

Check 3810 opposite last page.

The Nation's Top

100

Industrial Corporations All Use Harshaw Chemicals

Harshaw Serves 50 Different Industries!

For each of 50 different industries, including the Nation's top 100 industrial corporations, Harshaw produces a variety of important chemicals. For instance, the Petroleum Industry regularly purchases catalysts, metallic soaps, salts and crystals. The Automobile Industry buys electroplating chemicals and anodes, catalysts, fluorides, pigments and metallic soaps. The Chemical Industry uses products from six of our ten industrial divisions.

Harshaw produces over 1000 different chemicals for more than 15,000 customers throughout the World. *Probably we have a chemical you can use.* If you have something specific in mind ask us. At your request we'll forward a catalog listing our major products and describing our company.

HARSHAW

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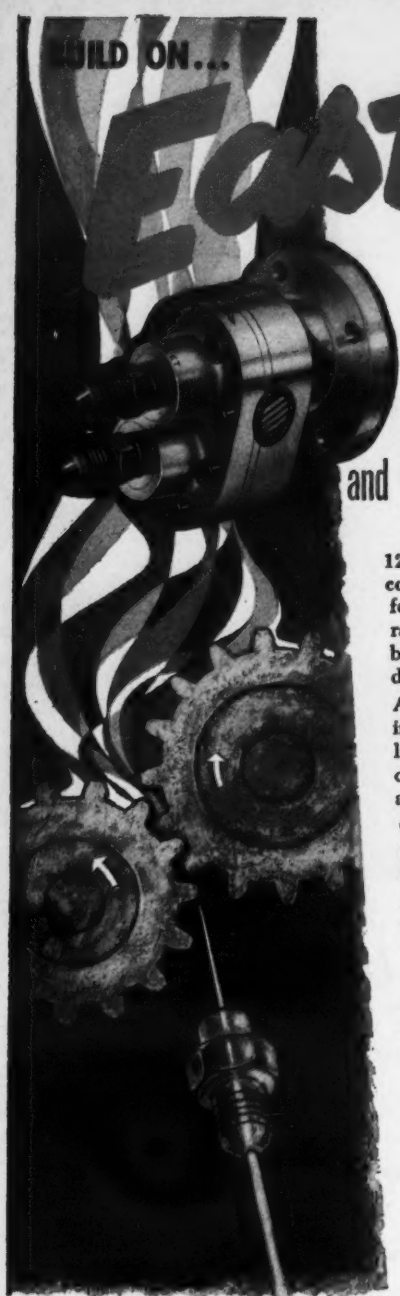
Check 3811 opposite last page.



BUILD ON...

Eastern

HYDRAULIC EXPERIENCE:

GEAR PUMPS and FLUID MOTORS

129 hydraulic pump and electric motor combinations are available off-the-shelf, for most applications. Outside this broad range, specific customer requirements can be met by drawing on Eastern's vast design resources.

All standard Eastern gear pumps are low in cost, light in weight, compact and reliable. Unique design features and very close tolerances enable each unit to achieve high volumetric efficiencies.

Check the performance ranges in these three major groups – do they meet your needs?

1200 series – up to 1.6 G.P.M. – pressures to 800 P.S.I.

100 series – up to 5 G.P.M. – pressures to 1500 P.S.I.

700 series – up to 9.8 G.P.M. – pressures to 1500 P.S.I.

In addition to these pumps, Eastern also produces a wide range of fluid motors, each capable of delivering a constant torque over a very wide speed range. They provide up to 14.5 ft. lbs. of torque at 1750 R.P.M. For full information on any one of these pumps, pump-and-motor combinations, or fluid motors, consult the Eastern sales engineer – or write for bulletin 810-S.

Eastern designs and builds

positive displacement pumps • gear pumps • centrifugal pumps

EASTERN INDUSTRIES INCORPORATED
100 SKIFF STREET
HAMDEN 14, CONN.

EASTERN INDUSTRIES PUMP DIVISION

Check 3812 opposite last page.

Trafalgar refinery waste treatment plant and aquarium

Going all out to whip water pollution and promote good community relations, Cities Service's new oil refinery boasts . . .

Waste treatment plant with an aquarium

"The fish like our treated water, so we must be doing a good job" — that's what Cities Service tells visitors at its Trafalgar refinery waste treatment plant in Bronte, Ontario. To prove the point, there is an aquarium right on the premises. Varieties of Lake Ontario fish swim unconcerned in the purified water.

The new refinery boasts one of the most modern waste treatment plants in the world. To foster goodwill within the community, the company encourages people to visit the aquarium and to tour the installation. They get a chance to see the efficient processing equipment and the modern laboratory facilities that keep close tab of the operations.

Uses Biological Oxidation

Processing about 300 gpm, the plant can handle any waste that comes from the refinery — including troublesome phenol and waste oil. Key to its success is biological oxidation, the process that makes use of bacteria to convert waste into a clear, harmless solution.

A network of underground pipelines gathers contaminated water and refinery waste into one main sewer running to the treatment area. After passing through oil separation step, the water enters an equalization basin — a rectangular pit large enough to hold one day's flow of waste.

This gives the various wastes a chance to react with one another. Acids and bases undergo partial dilution and neutralization. Air is bubbled in to aid oxidation and insure thorough mixing. Suspended particles become uniformly dispersed. Provision is made to skim off any free oil that may still be present.

From the basin, the waste flows by gravity to a pump pit where it undergoes final neutralization. It is then heated to 95°F and treated with ferric chloride in flocculation-clarification tanks.

Constant stream of air bubbles keeps floc and heavy particles near surface. Floating material is skimmed off and remaining waste water sent to primary and secondary aeration tanks where bacterial oxidation is initiated.

Bacteria and Plastic Packing

From secondary aeration unit, waste is pumped into big cylindrical shells containing corrugated plastic sheets known as Dowpac. The honeycomb structure of this plastic packing is designed to provide optimum conditions under which microorganisms

Tanks (right) are packed with corrugated plastic sheets designed to provide optimum conditions for bacterial oxidation

Huge equalization basin can hold one day's flow of waste from refinery. Tank also assures constant flow of waste water into treatment plant

oxidize wastes. Corrugated shape gives large surface area to which bacteria can adhere. In addition, it permits large volume air flow through packing to supply bacteria with necessary oxygen.

Waste water is pumped to top and distributed over the honeycomb by means of rotating perforated pipes. Waste trickles down over the plastic surfaces. The bacteria, adhering to the sheets, absorb most of remaining chemicals — particularly the phenol compounds.

Treated waste then flows to secondary clarifiers where all solid matter and excess bacteria settle to bottom and are scraped away to hoppers on inlet side. Floating material is skimmed to slotted pipe on outlet side. Clear waste water passes under this pipe and goes to holding basin.

Samples are taken to make sure that water meets rigid standards. From basin, water is pumped to stainless steel tank where it is mixed with ozone. This oxidizes remaining phenolics and also disinfects water.

To remove turbidity and any existing traces of phenol compounds, water is treated with activated carbon and fil-

To next page

Check 3813 opposite last page.

tered through sand filters. Resulting water is clear and sparkling, free of odor and taste, and rich in dissolved oxygen. This is pumped into the aquarium and Lake Ontario.

(Dowpac is a registered trademark for corrugated plastic sheets produced by The Dow Chemical Company, Midland, Michigan.)

Check 3815 opposite last page.

(Further information about waste treatment plant may be obtained from Trafalgar refinery, Cities Service Oil Company Limited, Toronto, Ontario, Canada.)

Jet-fuel-system water removed from action by molecular sieves

Risk of ice forming in fuel systems of jet aircraft is being eliminated by using molecular sieves. Getting rid of the moisture results in reduction of engine-flameout possibility.

Hard synthetic-zeolite pellets about the size of a grain of rice, are used to remove water from the kerosene-type JP-4 jet fuel. The fuel is passed through a bed of these pellets at rate of hundreds of gallons per minute. Moisture content is cut to almost zero ppm.

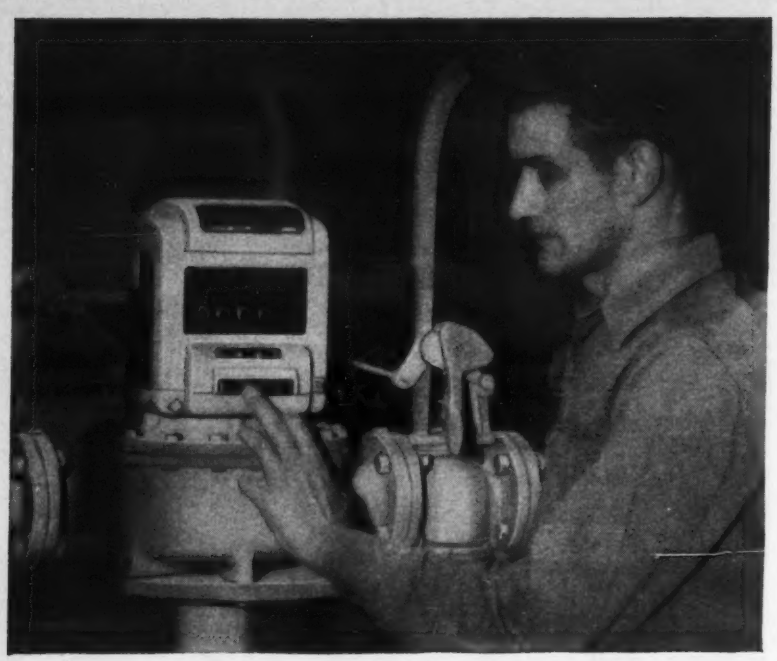
This dehydration is necessary because fuel dissolves water in proportion to temperature. At higher altitudes water is released which may freeze.

(Molecular sieves are product of Linde Company Division, Union Carbide Corporation, 30 E. 42nd St., New York 17, New York.)

Check 3816 opposite last page.

Silicone rubber for use in plastic tubing and model making operations is discussed in 8-page brochure. Advantages are listed and several case histories are presented. Typical sequence of operations required in preparing and applying the flexible mold material are also shown. Bul CDS-191 — Silicone Products Department, General Electric, Waterford, New York.

Check 3817 opposite last page.



HOW ST. REGIS PAPER CORP.

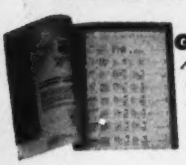
Meters Clay and Starch

FOR CLOSER FORMULA CONTROL

Six hints for you... six ways St. Regis' Deferiet, N.Y. fine paper mill saves time and improves quality... with accurate, automatic metering:

1. Measure water into dry clay to make 55% slurry
2. Add water to cut slurry to 15% ... measuring *both* 55% slurry and water with meters
3. Meter 15% clay slurry directly into furnish at fourdrinier machine
4. Meter both 15% slurry and water to reduce it to 2% clay content for beaters
5. Measure water into starch cooker for accurate 20% mix
6. Meter hot 20% starch into mixer (photo above), also metering in water for accurate dilution to 8%

It's all done with the Neptune Auto-Stop... the push-button meter that automatically shuts off at the exact quantity. Can save *you* time, materials and money, too.



GET THE FACTS
Ask for helpful Meter Data Bulletin 566 EP See Neptune Data Pages in Chemical Engineering Catalog.

neptune

NEPTUNE METER COMPANY
19 West 50th Street • New York 20, N.Y.

Branches in:
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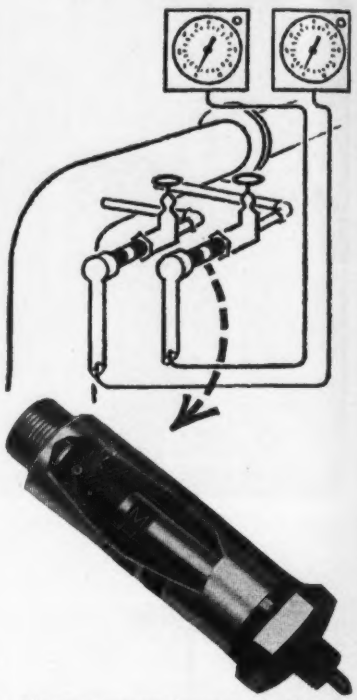
PHILADELPHIA • PORTLAND, ORE.
SAN FRANCISCO (Millbrae)
IN CANADA: TORONTO 14, ONT.

Check 3814 opposite last page.

MEASURING PRESSURE?

For greater accuracy use precision-calibrated SR-4® Pressure Cells



If you are measuring or controlling fluid pressure, you should know these facts about accurate, rugged SR-4® Pressure Cells. Standard accuracy: ±¼% (higher accuracies available for calibration). Calibration does not change with time. Contact fluid directly; require no external piping. Contain no moving parts. Output signal suitable for remote indication, recording or control. Widest pressure range coverage of any commercially-available transducers: 0 PSIA to 100,000 PSIG. Low line, low differential and high frequency models available. Special configurations can be provided.

Write for more information—address Dept. 16-I, and ask for Bulletin 4365

FIRST in force measurement

SR-4 BALDWIN BLH LIMA-HAMILTON

BALDWIN·LIMA·HAMILTON
Electronics & Instrumentation Division
Waltham, Mass.
SR-4® Strain Gages • Transducers • Testing Machines

Check 3818 opposite last page.

THAT'S INTERESTING

100,000-mph vehicles seen

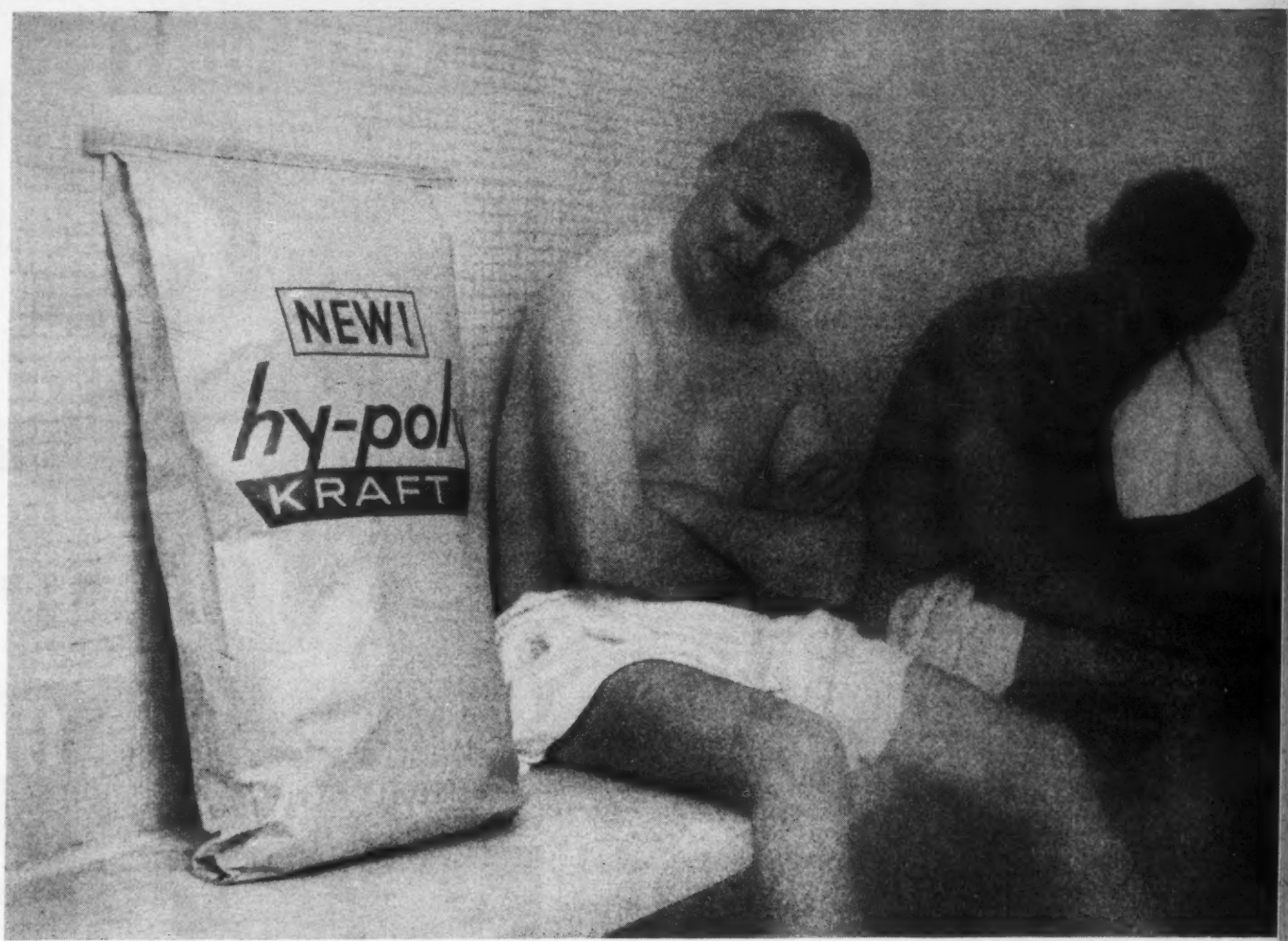
Research, development, and manufacture of ion engines that may rocket vehicles through space at over 100,000 mph is the objective of a new firm called Goodrich-High Voltage Astronautics, Inc. The thrust unit will accelerate and fire a stream of atoms aft which will drive space vehicles forward at tremendous velocities needed for interplanetary travel. Development of a laboratory ion engine is reported well under way.

Outlook good for PE pipe

More than 50 million lb of polyethylene resin was used for pipe in 1958. In 1954 the total was about 20 million lb. Forecasts are for 70 million lb this year, and over 100 million lb in two years.

For more information on product at right, specify 3819 see information request blank opposite last page.

Now International Paper saves you $5 to $16 per thousand PE multiwalls!



Read why new humidity-proof "Hy-poly" kraft makes medium and low-density polyethylene sheets extravagant!

THE multiwall bag you see taking a Turkish bath in our picture contains *calcium chloride*.

We steamed this new Bagpak® multiwall in 95% relative humidity at 120° F. for 48 hours. (Unprotected, under these conditions, this chemical takes on 2½ times its weight in water in about an hour!)

But when we opened up the bag, the thirsty crystals spilled out as though they had been stored on the Sahara!

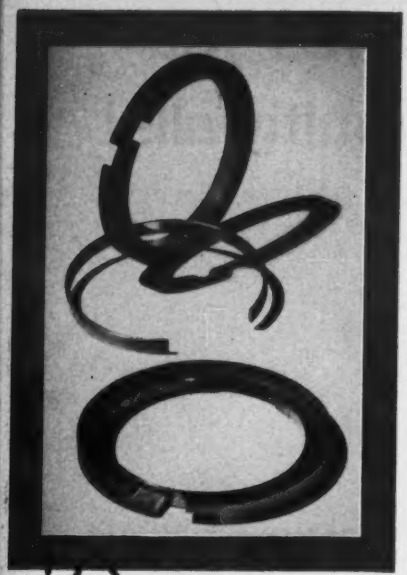
And Bagpak's new Hy-poly kraft *saves you money*. You stand to save from $5 to $16 per thousand multiwalls!

That's because new Hy-poly kraft is so superior to medium and low-density PE sheets that you get equal, if not greater, moisture-vapor protection from a coating approximately *half as thick!*

Extensive laboratory tests prove that this dramatic new barrier sheet is superior in *every way*. Write us today for samples.

See how calcium chloride protected by Hy-poly kraft Bagpak, pours after 48-hour steam bath!

Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.



Dore -

FLUOROGREEN® COMPRESSOR RINGS

Require No Lubrication
Give Ten Times Longer Service

Elimination of costly lubrication and ten times longer service means substantially increased performance; and greatly decreased maintenance and replacement costs when you install Dore' Fluorogreen Compressor Rings in reciprocating pumps and gas compressors.

Fluorogreen rings have the low coefficient of friction of virgin Teflon*; iron-like wearing characteristics and extraordinary resistance to chemicals, moisture and temperatures to 500 deg. F. Their strength and flexibility are excellent.

Many compressors, now in lubricated service, can be switched to non-lubricated service by the use of Dore' Fluorogreen Rings. They are available in two types: one-piece tension rings and three-piece segmental rings for grooved pistons.

For complete specifications and properties write for Bulletin L-58.

Fluorogreen is John L. Dore' Company's registered trademark for their filled Teflon.

*Registered trademark for DuPont fluorocarbon resins.

SEE US AT THE CHEMICAL INDUSTRIES EXPOSITION, NEW YORK CITY, NOV. 30 to DEC. 4, BOOTHS 1295 AND 1297

John L. Dore Co.

Check 3820 opposite last page.

IDEAS

Irradiation costs cut up to 90 percent with unit

Recently developed high-energy electron accelerator reportedly can slash cost of irradiation processing by as much as 90 percent. Low operating costs, teamed with simplicity of design and construction, is the key.

Cost of irradiation by the unit is consistently at least one-third that of present costs, says manufacturer. Operating cost is estimated at slightly over 50 cents per kwh

Simple, rugged electron accelerator, slashes processing costs, should boost use of irradiation processing

for unit rated at 15 kw. This figure includes amortization of $60,000 initial cost of machine, suitable processing facilities, and operation and power over 10 year period.

(Dynamitron electron accelerator was developed by Radiation Dynamics, Inc., Westbury Industrial Park, Westbury, Long Island.)

Check 3821 opposite last page.

Boost gasoline octane through the use of molecular sieves

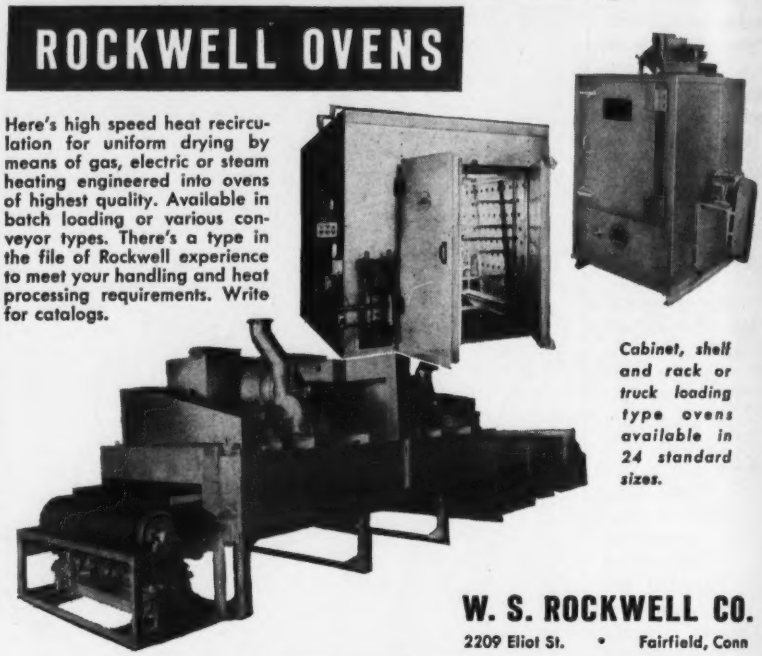
Cleaner burning, less knocking gasoline is being produced through use of "molecular sieves". The adsorbents have been found to be a practical tool for removing low quality normal paraffins from gasoline.

Getting rid of these undesirables by an economic process has long been a problem that has stumped the experts. Because normal paraffins are spread throughout entire boil-

for the MOST IN DRYING BENEFITS
—Uniform Drying or Curing
—Economical Heating
—Economical Handling

ROCKWELL OVENS

Here's high speed heat recirculation for uniform drying by means of gas, electric or steam heating engineered into ovens of highest quality. Available in batch loading or various conveyor types. There's a type in the file of Rockwell experience to meet your handling and heat processing requirements. Write for catalogs.

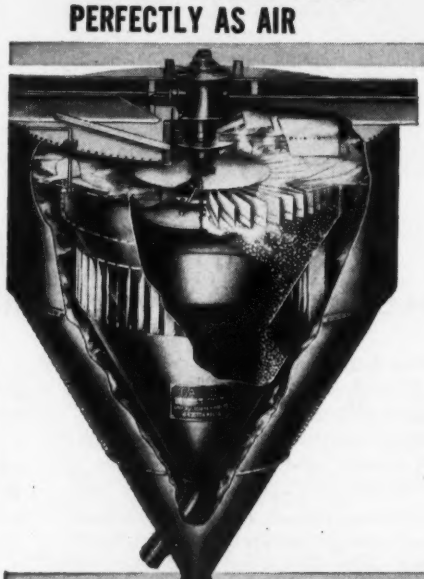


Cabinet, shelf and rack or truck loading type ovens available in 24 standard sizes.

W. S. ROCKWELL CO.
2209 Eliot St. • Fairfield, Conn

Check 3822 opposite last page.

USING SCREEN SEPARATIONS? NOTHING CLASSIFIES AS PERFECTLY AS AIR

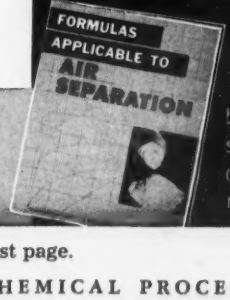


GAYCO
CENTRIFUGAL AIR SEPARATORS

Classify practically all dry fine materials

You get:
- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE.

RANGE 60 to 400 mesh. Timken bearings. Choice of Standard or Heavy-Duty Models.



this helpful booklet sent on request

Robert M. Gay Division
UNIVERSAL ROAD MACHINERY CO.
117 Liberty St., New York 6, N. Y.
Factory and Laboratory: Kingston, N. Y.
In Canada: Watson-Jack Hopkins Ltd., Montreal

Check 3823 opposite last page.

ing range and because concentration of each particular normal paraffin is low, separation by conventional methods, such as fractionation, has been impractical.

In the new technique, known as the Molex process, separation is caried out under conditions which are easily incorporated into normal refining operations. Equipment is relatively simple, consisting essentially of a primary and secondary separation section. The adsorbent molecular sieves are used in a fixed-bed isothermal manner. Feed and separated product streams are uniform and continuous. Temperatures and pressures are moderate and conventional materials of construction are satisfactory. Separation is readily accomplished in one operation. Pilot plant operated by Universal Oil Products Company, where process was developed, has shown that process will raise octane number of super premium gasoline to as much as 105. Units can be operated for extended periods of time with insignificant decline in sieve activity.

(Further information about Molex process may be obtained from Universal Oil Products Company, 30 Algonquin Rd., Des Plaines, Ill.)

Check 3824 opposite last page.

"Who gave you permission to make pizza pie in our—m-m-m, is it with sausage and anchovies or pepperoni and mushrooms?"

Alemite Portable Lubricator Saves 95 Man-Hours For Every Drum of Lubricant Applied!

Every point of lubrication in your plant can cost you needless time and money if you use old-fashioned hand lubrication methods!

With this Alemite portable air-powered lubricator, you save *95 man hours* for every 400-lb. drum of lubricant applied. Over *two* weeks of one man's time saved. That's how you can cut maintenance costs with Alemite.

In addition, Alemite's Model "711-A" is so compact and portable that it can bring clean, waste-free lubrication to *any* machine—*anywhere* in your plant—reducing machine downtime and prolonging machine life. Its pivot-swing dolly holds container upright at any pulling angle for easy moving over rough ground, indoors over rough floors, even up and down steps!

Step up to fast-moving, time-saving lubrication methods! Check Alemite's complete line of air-powered and electric-powered lubrication equipment for industry.

Symbol of SW Excellence

ALEMITE DIVISION

1850 Diversey Parkway, Chicago 14, Illinois

—MAIL COUPON FOR COMPLETE INFORMATION!—

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1850 Diversey Parkway, Chicago 14, Illinois
Please send me your free catalog of Alemite industrial lubrication equipment.

Name .....
Company .....
Address .....
City ..... Zone ..... State .....

Check 3825 opposite last page.

V219 SEP 59 XUM

NEW GIANT narda SONBLASTER

Generator G-5001
500 watts output

Transducerized Tank NT-5001
Capacity: 10 gallons
Dimensions: 20" L x 11½" W x 10" D

Generator features tank selector and load selector switches on front panel to operate one or two NT-5001 tanks alternately. Other combinations of tanks and submersible transducers available from stock; larger tanks available on special order. **$1325**

For mass-production cleaning and high capacity chemical processing!

Here's a new Narda SonBlaster ultrasonic cleaner with tremendous cavitation activity and generating capacity! Featuring full 500 watts output, this SonBlaster is available with a fully transducerized giant 10-gallon capacity tank. In addition, it will operate from six to 10 Model NT-605 high energy submersible transducers, at any one time, in any arrangement in any shape tank you need up to 70-gallon volume.

Install this new Narda SonBlaster, and immediately you'll start chalking up savings over costly solvent, vapor or alkaline degreasing methods! You'll save on chemicals and solvents, cut maintenance and downtime, eliminate expensive installations, save on floor space, and release labor for other work. But perhaps most important, you'll clean faster, cut rejects, and eliminate bottlenecks.

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Consult with Narda for all your ultrasonic requirements. The SonBlaster catalog line of ultrasonic cleaning equipment ranges from 35 watts to 2.5 KW, and includes transducerized tanks as well as immersible transducers which can be adapted to any size or shape tank you may now be using. If ultrasonics can be applied to help improve your process, Narda will recommend the finest, most dependable equipment available for immediate delivery from stock—and at the lowest price in the industry ($175 up)!

For custom-designed cleaning systems, write to our Industrial Process Division; for information on chemical processing applications, write to our Chemical and Physical Process Division; both at the address below.

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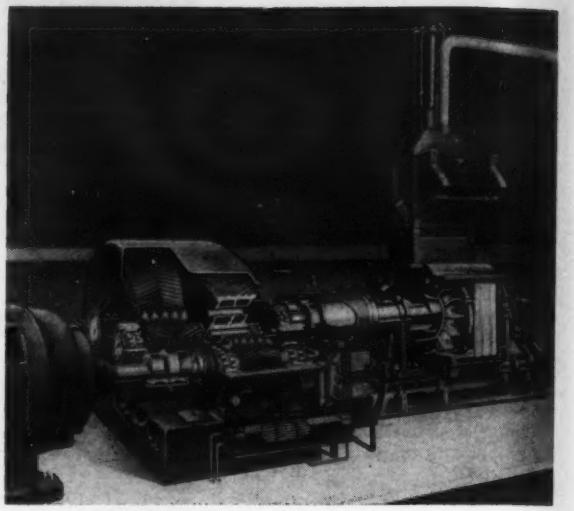
Check 3826 opposite last page.



Cutaway view of Banbury mixer used in Dasher process. Unit permits mixing and drying in one operation, can turn out 6000 to 12,000 lb dry rubber per hour

Newly developed process simplifies and speeds rubber manufacturing. Geared to efficient unit that by-passes need for excessive equipment, technique . . .

• Mixes, dries in one operation
• Slashes rubber making costs

Cost of manufacturing synthetic rubber may soon be reduced from $5 to $10 per ton, thanks to the development of a new economical process for dewatering rubber. Invented by rubber researcher, Dr. Paul Dasher, it permits raw rubber to be mixed and dried in a single operation — something that has been essentially impossible to do in the past.

Using a specially designed Banbury mixer, drying is achieved by applying intense shearing action to the product. This causes internal heating above the boiling point of water. Moisture flashes off as steam.

By-passes Pressing Step

Separate or preliminary pressing is bypassed since the Banbury unit accomplishes this too. The machine eliminates need for excessive, space-hogging, costly drying and cleaning equipment. At the same time, rubber output is boosted.

The technique permits simultaneous batching of carbon black, silicates, whitings, oils, and other additives. It can dry settling-tank precipitates not easily dried by conventional techniques.

Process has proved successful in mixing and drying synthetic rubbers such as standard butadiene, polybutadiene, and acrylonitrile. The latter product is more heat sensitive than the others and is normally dried by an expensive vacuum drying method. The new process also makes it possible to control the variations in the processability of the rubber.

Old Problem

The rubber industry has long sought a process to cut the high cost of drying raw rubber. In making synthetic and natural rubber, the raw material is precipitated from a latex which contains a high water content. After preliminary pressing, about 20% of remaining moisture is removed by steam or air drying in continuous conveyor ovens.

Conventional methods of drying have distinct disadvantages in that the particles of raw rubber invariably dry on the outside first. The dry exterior is then penetrated by water seepage from wet interior. Also, rubber is exposed to a high volume of air which tends to deteriorate it. Furthermore, very fine particles are difficult to dry on the porous screens used in most systems.

Existing processes also involve problem of excessive equipment cleaning, maintenance, and downtime.

The new process has already proved itself in commercial operation, having successfully produced and dried 12 million lb of many types of rubber. A large unit, the No. 11 Banbury, is reported to be

able to produce, from synthetic rubber slurries containing 50 to 70% water, batches of 400 lb of dry rubber in from 3 to 6 minutes — an equivalent of 6000 to 12,000 lb per hour.

(The Dasher Process is available for licensing through The Patent and Licensing Corporation, a wholly owned subsidiary of The Flintkote Company, 30 Rockefeller Plaza, New York 20, New York.)

Check 3827 opposite last page.

(Banbury mixers are product of Farrel-Birmingham Company, Inc., Ansonia, Conn.)

Check 3828 opposite last page.

Continuous production of unspliced hose in large sizes

Process has been developed for continuous-length production of large-diameter rubber hose. Sizes in production are two to eight inches ID. Hose

There are no splices to produce weak spots in large-diameter continuously produced hose

liner is wrapped and sealed on mandrel, wrapped with reinforcing cord, bagged, and cured, in continuous cycle.

(Rubber hose is product of Goodyear Tire & Rubber Co., Akron, Ohio.)

Check 3829 opposite last page.

Chemical and metallurgical testing service is outlined in illustrated brochure. Special section describes use of Cobalt-60 and Iridium-192 for radiography work. Copies of brochure may be had by writing directly to The Frank L. Crobaugh Co., 3800 Perkins Ave., Cleveland 14, Ohio.

Louisville Dryer—10 feet in diameter, 10 stories long!

Turn a ten story building on its side, and there'd be room to spare on either end of this huge pit lathe at Sharon, Pennsylvania where this 10′ x 110′ Louisville Dryer was fabricated.

This lathe is used for machining the reinforcing bands onto which are mounted the forged steel tires. This careful workmanship assures concentricity of the completed dryer shell—a primary factor in efficient seal operation.

Every Louisville Dryer is especially designed, manufactured, assembled and installed for its specific task.

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Offices in Principal Cities
In Canada: Canadian Locomotive Co., Ltd., Kingston, Ontario

Louisville Dryers

Check 3830 opposite last page.

Giant radioisotope unit checks fittings, castings at foundry

Can radiograph up to 12" thickness of steel

Highest-capacity radioisotope machine reported to be installed in the U.S. is now in operation at Cooper Alloy Corporation, Hillside, New

Business end of giant radioisotope unit. Demonstrator holding capsule in hand, shows amount of cobalt-60 needed in machine

Jersey. Used to radiograph heavy stainless-steel castings, valves, fittings, the unit is capable of handling a 1500 curie cobalt-60 source. It can radiograph up to 12" thickness of steel.

Previously, such radiographs could be obtained only with X-ray machines in the two- to three-million volt range.

The machine is housed in a specially-built blockhouse of four foot thick concrete to shield adjacent areas from gamma radiation. Unit uses as radiation source wafers of cobalt-60 no bigger than nickels.

(Radioisotope machine was produced by Picker X-Ray Corporation, White Plains, New York.)

Check 3831 opposite last page.

Fibrous silicone rubber has good tensile strength, withstands −65 to 500°F

Density is in the range of 20 lb per cu ft

Fibrous silicone rubber has been developed having properties somewhat resembling silicone sponge and foam. Product consists of a matt of

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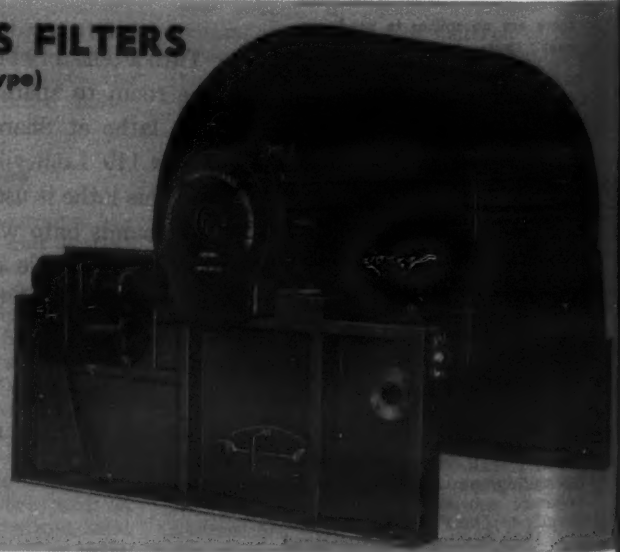

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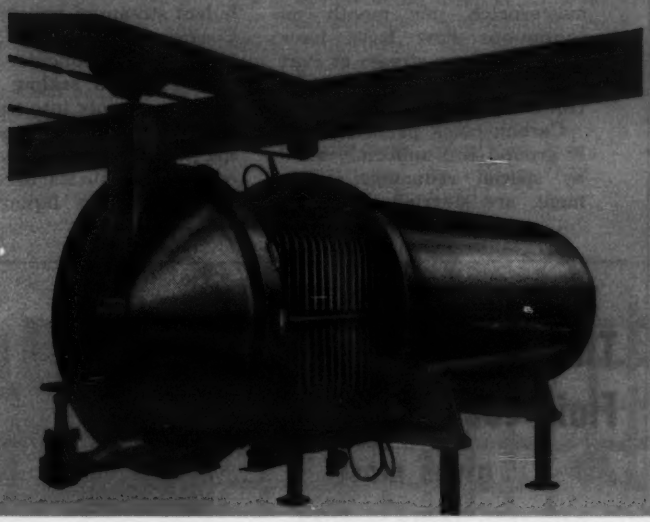
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silicone rubber fibers, oriented in completely random manner. The random orientation of fibers accounts for product's high tensile and tear strength.

Useable temperature range is −65 to 500°F. Permeability is good with density ranging about 20 lbs per cu ft. Product also has good compression-deflection characteristics. Material is presently available in ¼ inch-thick sheets, 9 inches wide and six feet long. Larger sizes are being planned.

(Cohrlastic FSR was developed by The Connecticut Hard Rubber Co., New Haven, Connecticut.)

Check 3833 opposite last page.

Air-conditioning system kills microorganisms with LiCl spray

Effectiveness of system tested to be 97%

Chemical liquid-type dehumidifying equipment has been in successful operation for seven years at Procter & Gamble's Miami Valley Laboratories.

Absorbent-type equipment receives 43,000 cfm of filtered outside air at max summer conditions of 95°F dry bulb and 78°F wet bulb. In air-washer chamber of this equipment, fresh air contacts spray of lithium-chloride-base absorbing solution. Later both air and solution are passed over cooling coils, through which 60°F well water is pumped.

Testing of the Kathabar system's microorganism-removal effectiveness was conducted for seven years by the Research Foundation of Toledo University. Results indicate that 97% of all airborne pathogenic and nonpathogenic organism are removed by this air-conditioning system.

(Kathabar air conditioners are product of Air Conditioning and Drying Division, Surface Combustion Corporation, 2375 Dorr St., Toledo 1, Ohio.)

Check 3834 opposite last page.

V219 SEP 59 XUM

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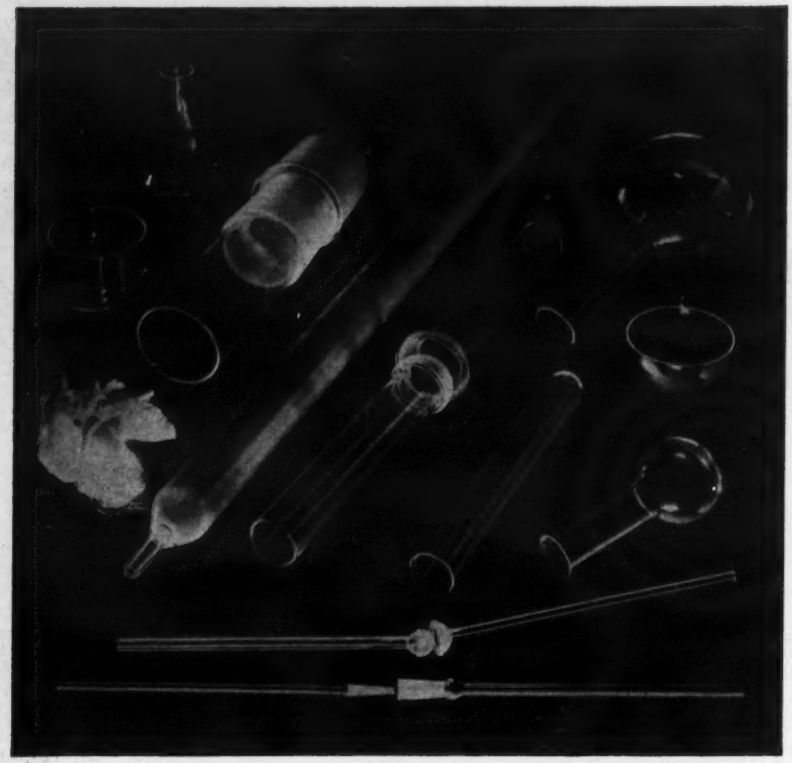

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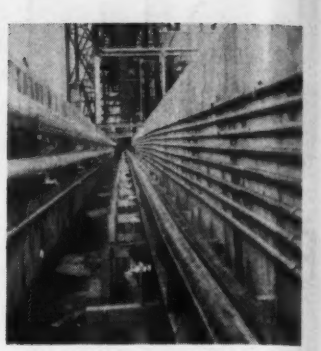
Check 3835 opposite last page.

Ruthner process for recovering sulfuric acid from waste pickle liquor concentrates is topic of two-page process sheet. Photographs of typical installations are shown. Plant investment and operating costs are listed. Flow diagram is included. Sulfuric acid recovery—Blaw-Knox Company, Chemical Plants Division, Pittsburgh, Pa.

Check 3836 opposite last page.



One of largest installations of its kind, 500-foot-long zipper-belt conveyor (arrowed) carries carbon black from freight cars to silos

Carbon black, rubber blended intimately in masterbatch

Facilities costing more than $1¼ million and capable of producing 7500 tons of carbon-black synthetic rubber masterbatch per month on continuous flow basis have been placed on stream at Port Neches, Texas, by Goodrich-Gulf Chemicals, Inc.

Carbon-black particles, finely ground and uniformly sized by special reduction equipment, are slurried, then hydraulically injected into turbulent stream of liquid rubber. Coagulant (acid) is added, blending components instantaneously and sealing carbon black uniformly into rubber. Following conventional drying and filtering, product is compressed into standard bales and bathed in liquid soap-

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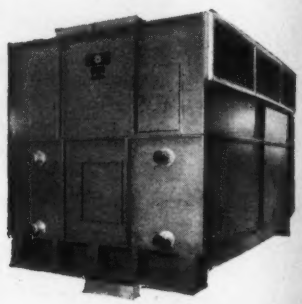

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stone instead of powdered — giving more uniform covering and eliminating clean-up problems.

Improved abrasion resistance for heavy-duty surfaces, and up to 15% more road life are reported for product when used as tire tread or retread stock.

Efficient zipper-belt conveyor, 500 feet long, conveys carbon black from freight cars to silos. Belt automatically closes into tube as it leaves loading zone; reopens at discharge end.

(Ameripol Micro-Black masterbatch is manufactured by Goodrich-Gulf Chemicals, Inc., 3121 Euclid Ave., Cleveland 15, Ohio.)

Check 3838 opposite last page.

(Zipper belt conveyor is product of Stephens Adamson Mfg. Co., 17 Ridgeway Ave., Aurora, Ill.)

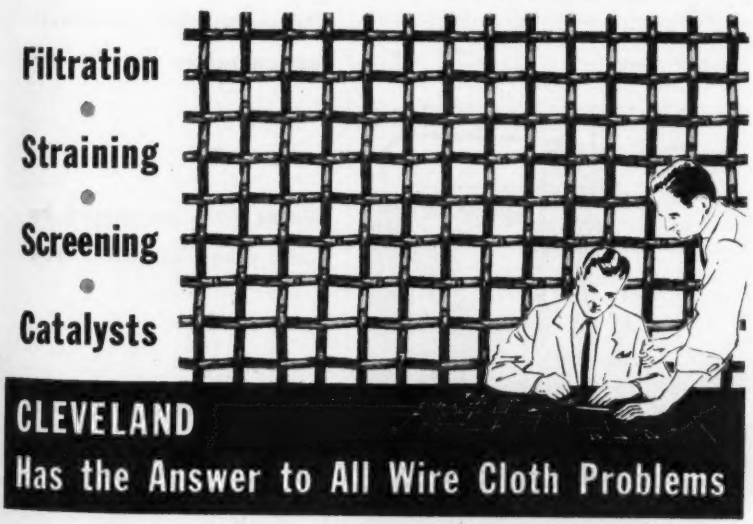
Check 3839 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Multi-flash evaporation distills sea water at lowest cost

A 40-stage flash-evaporation system will reportedly distill sea water at less than half the cost of extending present conventional water system, in plant now being constructed on English Channel island of Guernsey. Plant is first of its kind in an area of adequate precipitation. A similar plant will be erected in Sheikdom of Kuwait. It will provide over two million gallons per day.

(Multi-flash plant is being constructed by Weir, Ltd., Glasgow, Scotland.)



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At West End Chemical Company

OLIVER TYPE "L" PUMPS handle 60-80 gpm of brine filtrate in continuous service

There's no sense in prettying-up a photo like this—it tells better than words the kind of duty for which Dorr-Oliver pumps are designed. These particular pumps are in service at the West End Chemical Company, California, a division of Stauffer Chemical Company. 24 hours a day, 7 days a week, they handle 60 to 80 gpm of brine filtrate—one step in a giant processing operation that produces soda ash, salt cake, borax and hydrated lime.

Oliver Type "L" Pumps are of alloy metal construction, with lifetime grease or oil lubricated bearings and choice of either mechanical seals or stuffing box. Five standard sizes take care of most needs. They are one of the three specialized types of pumps made by Dorr-Oliver for corrosive liquid or slurry handling service—the only complete line for coverage of all chemical industry requirements. Write to Dorr-Oliver Incorporated, Stamford, Connecticut for comprehensive new bulletin—or contact a nation-wide network of representatives and distributors.

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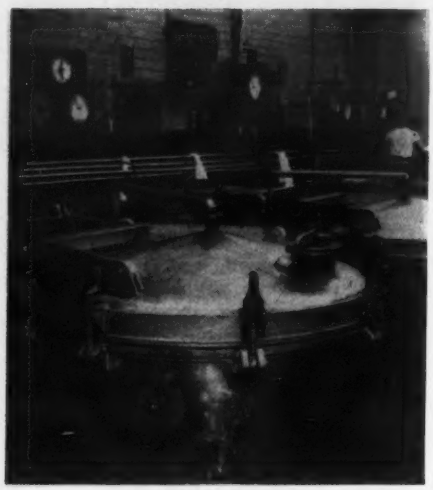
SILICONE NEWS from Dow Corning

Down Foam and Up Production



IN PACKAGE DYEING

No matter what you produce or process, you'll find Dow Corning silicone defoamers are economical; savings and production advantages are multiple. Prove this with your own tests using a generous trial sample that's yours for the asking. In writing for this free sample, please indicate your problem and mention the type of system—oil, aqueous, nonaqueous, food products, or any other. Address Dept. 3221 for a rapid reply.

Job-Proved Dow Corning Silicone Defoamers Save Time, Material, Money

Foam may be fine in a brewery. But in most processing plants, it's a sign of inefficiency. Foam reduces production capacity, slows processing, increases waste — can skyrocket your costs way out of proportion. But why accept foam as a necessary evil when Dow Corning silicone defoamers are so readily available to knock out "bubble trouble" . . . quickly, easily and economically?

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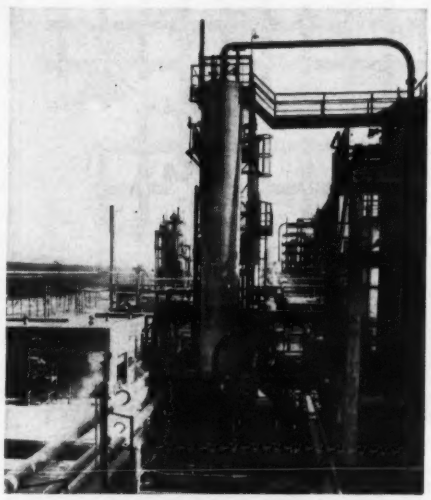

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INSTRUMENTATION FEATURE SECTION HIGHLIGHTS

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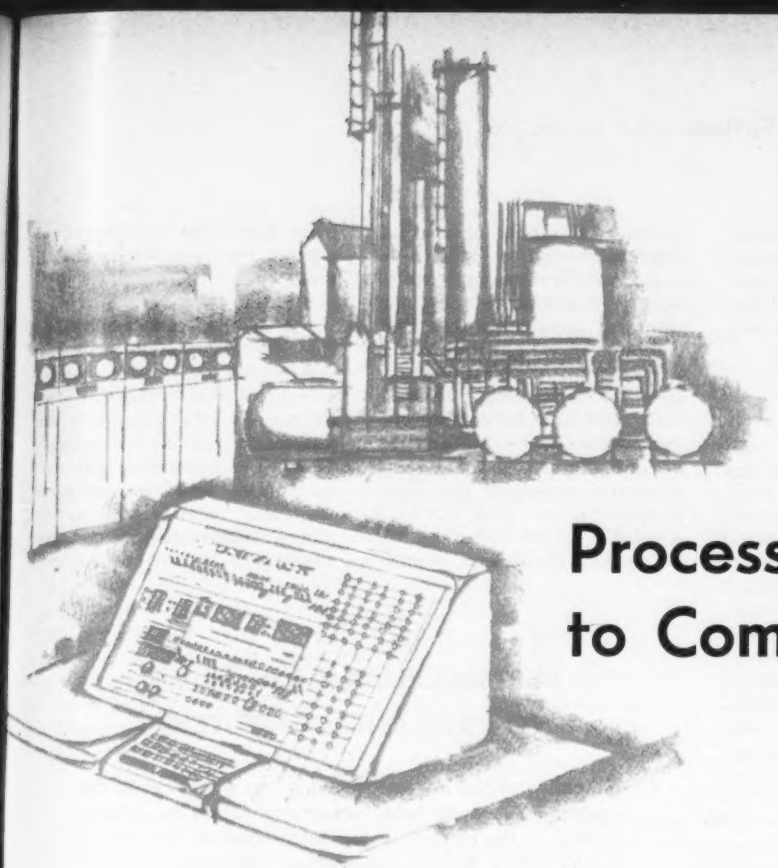

EXCLUSIVE CP REPORT

The number of chemical companies actively evalulating the use of computers in chemical process control is growing steadily. How soon will these initial kernels of investigation grow into a sturdy oak of accomplishment? Estimates range from two to ten years, with many questions still to be answered. Cooperation will be essential with . . .

Process Knowledge the Key to Computer-Control Future

COOPERATION is the watchword that will guide computer application to future process control. In the words of I. Melville Stein, Leeds & Northrup Co. . . . "I think there has never been an undertaking that requires more cooperation between user organizations and control manufacturers than the application of computer control to continuous industrial processes." This feeling is reiterated again and again by top people among instrument companies, computer suppliers, and chemical manufacturers.

Computers, as operating "hardware," are here. Their utilization and integration into complete control of major chemical processing operations, remains to be accomplished.

Estimates on when such control will be generally achieved range from two to six years or longer, with the predominant opinion favoring the longer time. It will be an evolution rather than a revolution and should accelerate as extended computer use leads to further understanding of process dynamics and highlights the design improvements needed in instrumentation.

The Road Ahead

Economic considerations will probably have the greatest influence on speed with which computer control is installed. "Present high cost of computers will limit their general use to processes in which a high return in dollars can be gained from a small increase in efficiency," maintains D. C. Sanford, The Bristol Company. Computer control will become more attractive as the continuously increasing cost of labor and growing competition for consumer dollars among domestic producers themselves, and between domestic and foreign producers, necessitates minimizing of production costs and increasing quality.

With several processes already under computer control — although proper evaluation may take years — competing companies cannot afford to wait too long. Many will, of course, wait to see the results of the pioneering efforts. How long will this take?

J. T. Ator, Librascope, Inc., believes that "by 1962 or 1963 increased knowledge of process reactions by the operators will have been achieved concurrently with improvements in system reliability by the computer manufacturers. This should result in installation of computer control systems in all of the major petroleum and petrochemical plants by that time or shortly thereafter." Lowell S. Michels, Bendix Computer Div., "envisions 1970 as a time when computer process control will be commonplace."

First, Know the Process

There are other factors that must be considered. Advanced forms of control cannot be realized unless the process plant itself is susceptible to such control. Chemical engineers must develop concepts and tools needed to simulate chemical and physical processes. Knowledge of the process to an extent necessary to program a computer is much more difficult to develop than the knowledge needed to run a plant and get an effective commercial result using technical people and operators to make changes according to judgment.

Today, the human operator uses correlations in controlling his plant, but seldom are these correlations really based on quantitative or dynamic considerations. The on-line plant computer uses correlations, too, but these are, and must be, determined quantitatively and dynamically by systems study.

In the words of R. D. Webb, Union Carbide Olefins Co. . . . "To optimize an olefin plant, for instance, will take many man-months of systems study. This, and the inclusion of near-precision quantity- and quality-measurement instrumentation, will cost more than the computer itself. Including the computer within the control loop must be done to realize its full value. At the same time, to do so without having mathematically determined the basic correlations and restrictions can prove costly, even disastrous."

The mathematical statement of the process to the extent necessary for automatic control seems to be the limiting factor. This process knowledge, although lacking at present, is increasing rapidly as more computers are being used in design and simulation of processes. Systems engi-

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The editors of CHEMICAL PROCESSING magazine wish to thank these persons and companies for contributions and suggestions used in preparation of this article.

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Computer-Control Future *From preceding page*

neering provides the techniques for designing processes specifically for computer control and it is in this way that the major benefits can be obtained.

A Gradual Change

Optimum advantages will be gained when processes are specifically designed for computer control, probably through computer use. What can be done on processes already in existence, and how?

"It seems likely that computers will be superimposed on relatively conventional control system," states G. E. Russell, Monsanto Chemical Co., "until reliability of computers has been demonstrated. Then they will begin to replace separate controllers. The use of adaptive controls and small optimizing computers is a new field just now beginning to be investigated, but one which promises to be very fruitful."

Consensus of both instrument manufacturers and users, as summed up by Albert Sperry, Panellit, Inc., is that, for the next few years at least, "computers will not replace individual process-variable controllers." They will be used to provide intelligent settings for such controllers, settings which will move the process toward higher efficiency and higher output quality and quantity.

Even then, George M. Muschamp, Minneapolis-Honeywell's Brown Instruments Div., believes that computers "will not, even in the future, replace individual control instruments. Computers have little process-sensing ability or ability to effect final control actions. They are not an isolated phenomenon but a natural evolution from industrial measuring and controlling instruments as more and more functions have been embodied in one instrument case, and as more and more interacting variables have been associated in one panel or control loop."

There is a moot area on the question of ability of present instrumentation to "talk to" a computer in language sufficiently sophisticated. Some chemical companies feel that computers will require a higher order of absolute accuracy in measurement than is now attainable by commercial instrumentation. Information beyond the conventional temperature, pressure, and flow measurements now made available to the operator will be needed. On-stream, continuous analytical equipment is a must for computer installations.

A Question of Reliability

Are the computers themselves reliable enough? What happens to the process when automatic control ceases? These are questions that users raise, and the answers can only come from experience. Some equipment manufacturers believe that pres-

SEPTEMBER ISA CONFERENCE TO HIGHLIGHT COMPUTERS

Indicative of the interest that is being evidenced in the computer's present and future application to process control, is the expanded portion devoted to the subject in this year's Annual Automation Conference and Exhibit of the Instrument Society of America.

Fifteen sessions, or approximately 30% of the conference total, are on computers or directly related subjects. The number is greater than for any previous annual ISA conference. This reflects, ISA officials pointed out, the increasing rate at which industry has been seeking higher efficiencies through the use of computers. In many cases, they added, sufficient experience for realistic performance appraisals has been available only in recent months.

Regarded as among the more significant presentations are those which will discuss:

- **The reliability of on-line equipment.**
- **An analog computer for on-line control of a chemical reactor.**
- **A new approach to the evaluation of process control.**
- **The economic value of performance prediction.**
- **The development of equations for computer calculation of control-valve sizes with accuracies as much as 25% greater than conventional methods.**

Meetings dealing with aspects of computer technology have been scheduled on each day of the conference in Chicago, starting Monday, September 21 and continuing through Thursday, September 24. Most conference sessions will be at the Palmer House. An exhibit of the latest computers and other instrumentation equipment will be held in the International Amphitheatre in Chicago on a schedule to facilitate attendance at both functions.

ent units are sufficiently reliable, others do not agree. Daystrom Systems Div., of Daystrom, Inc. guarantees system availability of 90% over continuous periods of six months. Bendix Computer Div., feels that reliability figure of 99.9% would be maximum, but this is yet to be reached, or even closely approached.

A Note of Caution

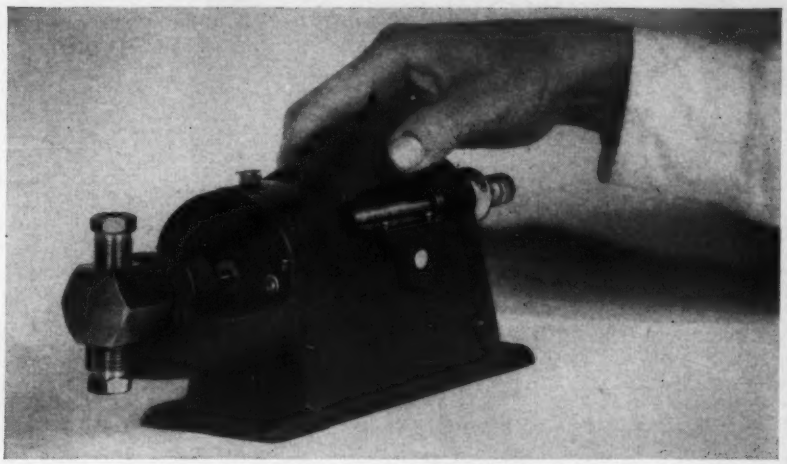
Although the pattern of computer control seems to be fairly well established, a note of caution is heard in a number of instances. H. Grohskopf, American Cyanamid Co., suggests . . . "In the beginning, work toward computer control should focus on processes that are relatively well understood, with well-developed methods of on-stream analysis, and with large capital investment and high production volume. Such applications will give manufacturers an opportunity for pioneering in automatic control at minimum risk and with maximum chance for orderly development of a new process design and process control technology."

Computer manufacturers must use caution in process control applications. Promising too much too soon could lead to serious setbacks. As in the case of early applications of electronics, particularly vacuum tubes, suppliers of measuring instruments and control devices used them prematurely. Results were not good. As a consequence, when vacuum tubes and their related circuits had been developed to a satisfactory degree of reliability many purchasers who could have benefited from their use, shied away.

Norbert E. Weber, The Foxboro Co., sums it up this way. "We must know what we expect the computer to accomplish. The greater challenge is to decide what should be computed to get better operation . . . the conventional controls are already running the plant."

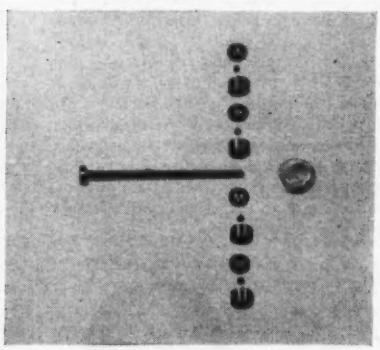
how to meter small quantities of liquid accurately

THERE'S no basic change in the physical properties of a liquid whether you pump large or small volumes. But as the volume being pumped approaches the milliliters per hour (ml/hr) range, several constant characteristics of liquids tend to become serious problems. Metering success depends on how well these problems are solved by pump design and operating practice.



Compressibility:

All liquids are compressible, but so slightly that there is rarely much cause for concern. In small volume metering, however, the 0.027% reduction in volume of water which accompanies each additional 100 psi pressure can represent a 0.3% loss in pumping efficiency. Thus the existence of high or fluctuating discharge pressures *must* be considered when choosing a micro pump.



Entrapped air:

Bubbles can be troublesome even in high capacity controlled volume pumps. But when you're metering at the rate of 1/60 *ml per stroke* to 0.3% accuracy, a bubble can spell disaster. Good pump design can minimize the bubble problem by speeding bubbles through the liquid end in a very few strokes, but only good pumping practice can eliminate it. In our experience, there is no substitute for a deaerator in the line.

Viscosity:

Low viscosity liquids tend to pass between any but the most perfectly mated ball checks and seats. Ball seating techniques recently introduced by Milton Roy have eliminated this problem, however, and extended the number of liquids that can be accurately pumped in small volumes. For example, a miniPump® is now successfully pumping 85 ml/hr of cyclohexane against a discharge pressure of 1,000 psi to an accuracy of ±0.6%.

Minute volumes also impose tight specifications on the pump itself. Plungers, balls, and seats must be finished to a degree of near perfection. Parts are inspected under powerful microscopes for any sign of imperfections. Proper mating of balls and seats is so critical that a rigorous functional test is necessary.

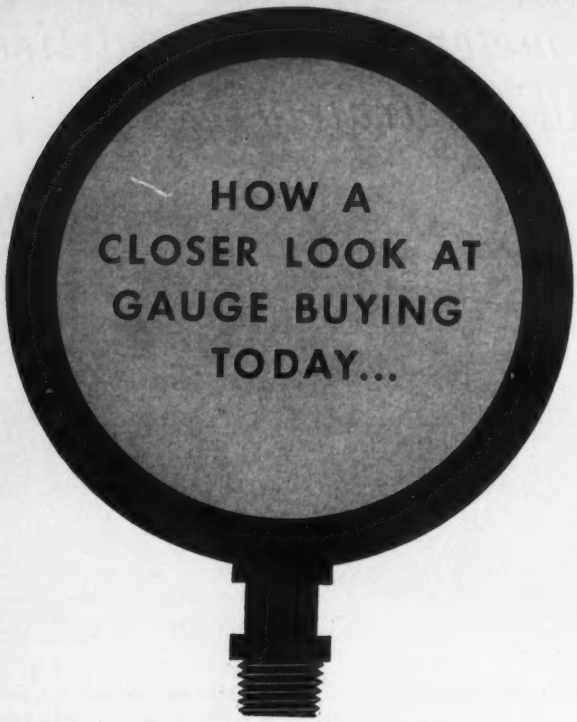
Solving these unusual problems demands such special equipment as the Milton Roy miniPump, *and* special pumping practices. Together they permit numerous metering jobs not otherwise possible. MiniPumps are standard equipment wherever small volumes of expensive or dangerous liquids are to be accurately metered into large process streams: perfumes into soap, dyes into cheese, odorants into natural gas, and hydrazine and other amines into boiler water. MiniPumps have also proved themselves in the chromatographic analysis of amino acids, feeding influent buffers to the columns and accurately introducing ninhydrin reagent to the effluent.

If precision pumping of small volumes of liquid is one of your problems, look to Milton Roy's 25 years of experience for your most economical solution. For more detailed information on miniPumps, write for Bulletin 1257-1. Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pennsylvania.

milton Roy
CHEMICAL INSTRUMENTATION SYSTEMS

Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • pH Instruments

Check 3843 opposite last page.



can save up to 40% on many pressure gauge applications

Analyzed your gauge needs lately—how much gauge performance you're getting, compared to what you need and what you pay for? Perhaps it's time for a closer look at United States Gauge with its line of 50,000 standard pressure gauges, plus specials (and all possible choices in case styles, sizes, materials and pressure ranges). For example, note how you can save up to 40% on premium gauges and still get premium performance with the USG A-Line *(top, right)*. Note, too, how you can get the exact gauge for *any* need and cut waste of under-buying or "over-gauging" . . . from all the gauge lines available at this one source. Then check the USG distributor listed in your Yellow Pages. Or write direct for catalogs and name of your nearest distributor today.

Paying needless premium prices for reliability? USG A-Line pressure gauges have premium construction, save up to 40% on premium prices. Meet A.S.A. Grade A standards, including 1% accuracy. Extra rugged, they are built to *deliver* longer under severe operating conditions, where you do not require the accuracy of Grade AA gauges, but where reliability and cost-cutting are "musts". Wide choice of Bourdon tubes, case styles and sizes, pressure ranges, and movements. You must see the sturdy design and price to believe the value and performance. Models for general-purpose service, altitude, refrigeration, ammonia and hydraulic applications. *Write for Catalog 305.*

Buying too much gauge for your purpose? Save with volume-priced, precision-built USG Drawn Case Gauges for service where your gauge need calls for A.S.A. Grade B standards, including 2% accuracy. *Write for Catalog 64A.*

Getting all the accuracy you're paying for? You can't buy more precision than with USG Test Gauges which meet or exceed A.S.A. Grade AA standards, including accuracy as high as 0.2 of 1%. *Write for Catalog 400.*

USG **UNITED STATES GAUGE**
Division of American Machine & Metals, Inc., Sellersville, Pa.

Find Your Nearest Distributor in the 'Yellow Pages'

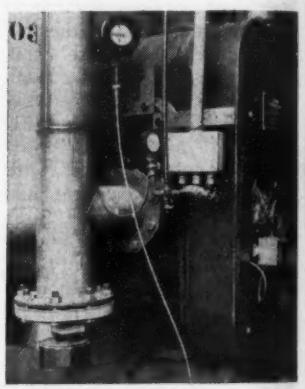
Check 3844 opposite last page.

Black and white liquors measured accurately by propeller meters

Key paper pulp components are properly proportioned

Problem: Intense heat and harsh chemical action create a serious metering problem on black and white liquors used in manufacture of paper pulp at Longview Fibre Company, Longview, Washington. Accurate proportioning of these two pulp components to digester is essential for high-quality product.

Solution: Stainless steel propeller meters were installed to measure liquor quantities. Two 10″ units are



Stainless steel propeller meter is installed directly in liquor line (bottom). Room-consuming measuring tanks are eliminated

utilized, one for each stream. Batch control instruments and registers are mounted in a central panel over 100 feet from meter installation. Desired quantity is set on control instrument. When this quantity has been reached, pumps are automatically halted.

Results: Meters have provided dependable, accurate, control of both flows to maintain paper pulp quality. Since units can be installed in any position, installation in lines eliminated necessity for large measuring tanks.

(Propeller meters were designed and manufactured by Sparling Meter Co., 225 N. Temple City Blvd., El Monte, California.)

Check 3845 opposite last page.

Computer cuts cost of kiln computations

Equivalent of one man-year of labor can be performed in less than two hours

DONALD TSCHABOLD, Process Machinery Dept.
and **DAVID C. LOVEJOY,** Engineering Analysis
Allis-Chalmers Mfg. Co.
Milwaukee, Wis.

Computer installation at Allis-Chalmers, showing control processing unit (left) card reader (center) and data printer (right). Directly to the right of control unit is cathode-ray-tube scope on which solution can be directed

Close-up of computer's control processing unit. Computer processes in 30 minutes to two hours data that would require 2500 manhours of manual calculations

Calculations in rotary-kiln design have been reduced from monotonous, time consuming, and costly procedures to a quick, accurate system at Allis-Chalmers Manufacturing Company, utilizing digital computer facilities. From an estimated 2500 manhours, approximately one man-year, time requirements for complete calculations have been reduced to the range of 30 minutes to two hours.

Typical static-deflection problems in kiln design had previously been done by longhand calculations. Doing the problem by "theorem of three moments" method for a seven-support kiln took 40 to 50 manhours. Using a desk calculator, working time was reduced to 20 manhours at a cost of about $100.

First rotary-kiln calculations were done on a card-programmed digital computer early in 1956. Problem solved was for a seven-support kiln, 530′ long. Exclusive of preparatory work, computer was capable of finishing the problem in 40 to 60 minutes at a cost of about $20. Solution was more accurate than those resulting from manual calculations. When a more advanced computer replaced the card-programmed calculator, these calculations took approximately 15 minutes at a cost of about $7.

On computers mentioned, each kiln problem was tabulated, sent to the unit, calculated, and the results anlyzed. If kiln weight was not distributed equally enough on each support, spacing of supports would be changed and problem recalculated.

With a recently delivered digital computer having a core storage capacity of 8192 words, performing 4200 to 42,000 mathematical operations per second, problem solving was again speeded. Unit is capable of doing a mutliple solution of the problem whereby spacing is automatically varied until an equalization of loadings at the supports is obtained. At this time any masses which are associated with the given support, such as gears, are repositioned and procedure repeated. This equalization can be carried out to an answer within requested tolerances.

After support locations have been optimized, riding rings are added and final stress calculations performed. Results include shear, moment, slope, deflection, and stress at many positions along the length of kiln. Loading on each support mechanism also is calculated.

Bending stresses and shell deflections of optimized design can be compared with limiting values of stress and deflection. A decision will then be necessary to effect a reduction or increase in either of these values, resulting in further optimization of support locations.

Calculating time required will vary considerably, depending upon number of supports, magnitude of moving masses, number of supports that will become fixed, and finally, the acceptance based on stress and deflection. It might run from 30 minutes to two hours.

As a comparison, a single static-deflection calculation using a desk calculator required 20 manhours. In process of optimizing, outlined above, as many as 100 to 200 such complete calculations might be required. To this must be added time required to rearrange supports, estimated at 500 hr, for a total manual calculating time of at least 2500 hr, the equivalent of one man-year of labor.

Rotary-kiln design by computer in the future will include selection of carrying mechanism, riding rings, power calculations, and selection of drive components. This would include a torsional vibration analysis of kiln and drive system.

(Model 704 digital computer is product of International Business Machines Corp., 590 Madison Ave., New York 22, N. Y.)

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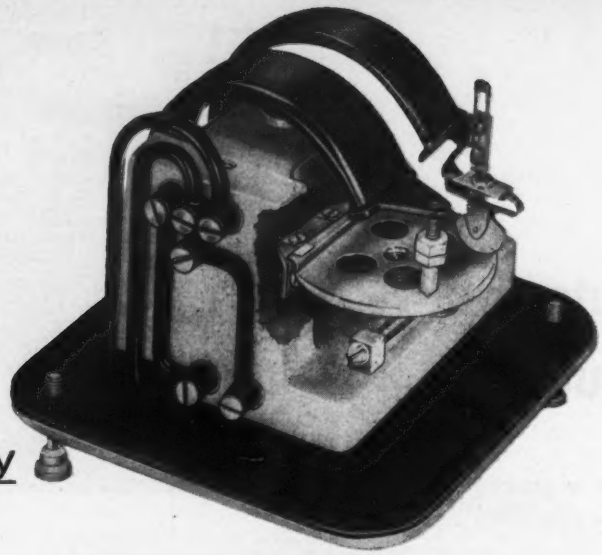
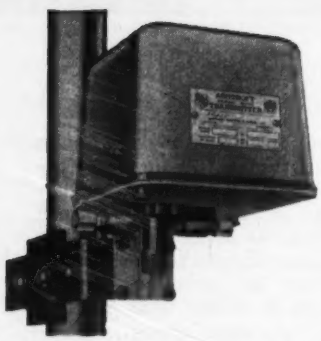


NEW
high sensitivity
ASHCROFT
PNEUMATIC TRANSMITTERS
lower costs...reduce maintenance
...provide tighter control



Ashcroft Non-Indicating Pneumatic Transmitters are made in pressure and temperature types, each in regular and short span. Operation is on low-pressure air: output range, 3-15 psi or 3-27 psi.

These new transmitters are designed around (1) a powerful, efficient relay with sensitivity high enough to operate controllers, and (2) a simple, dual Bourdon tube motion-balance system. High sensitivity permits the use of narrowest proportional band settings on controllers and allows instant controller response to deviations from set point. With a shorter transmission lag, automatic corrective action starts before the deviation becomes critical.

In manual control systems, these new Ashcroft Transmitters (teamed with suitable receivers) make it practical to operate boilers at the most efficient level. In wet processing operations, fractionating columns yield a purer product. Highly suppressed Ashcroft Short Span Transmitters are so sensitive they can "judge" entire control loops and detect any errors in the system.

Basically a 6" cube, lighter than most 8½" pressure gauges, these climate-proof Ashcroft Transmitters are simple to install in cramped locations, are most readily accessible for adjusting or service. Calibration is extremely easy, with linearity checking entirely eliminated. Most parts in all types in the line are interchangeable. Ask your nearby Ashcroft Gauge Distributor about the lower initial costs and other savings that follow when you install Ashcroft Non-Indicating Pneumatic Transmitters. Send for Bulletin 361.

MAXWELL MM&M MOORE, INC. TRADE MARK MANNING

ASHCROFT PNEUMATIC TRANSMITTERS
A product of
MANNING, MAXWELL & MOORE, INC.
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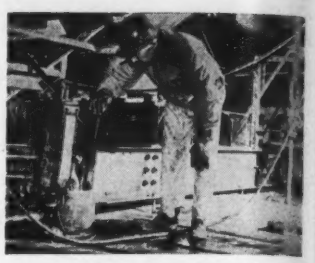


Corrosive acid flow handled by rotameter

Continuous, accurate, easy-to-read indication is provided for 94% sulfuric acid by "Safeguard" rotameters at Vitro Uranium Company's 660 ton/day mill at Salt Lake City, Utah. Close, careful control of acid flow is important to successful leaching operation in production of uranium minerals. Modern extraction system, utilizing sulfuric acid, achieves greater recovery of uranium than older phosphate precipitation operation. Rugged design and materials of construction of rotameters assure trouble-free performance in corrosive service and atmosphere.

(Safeguard rotameters are product of Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.)

Check 3848 opposite last page.

Compact DC timers are pneumatically operated

Uses: Providing time delay in DC circuits from 0.2 sec to 1.0 min.

Features: Compactly built DC timers are rated for pilot applications to a maximum of 600 volts.

Description: Unit measures 2-15/16" by 4-27/32". It is available for either on-delay or off-delay operations. An invertible magnet structure permits in-the-field conversion from one form of operation to the other.

(Type H DC pneumatic time-delay relay is a product of Square D Company, 4041 N. Richards St., Milwaukee 12, Wisconsin.)

Check 3849 opposite last page.

INTERESTING THAT'S

Apatosaurus 'raincoat'

Polyethylene film made by the Koppers Company is used to keep a Jurassic Age dinosaur dry during cleaning operations at the Carnegie Museum in Pittsburgh.

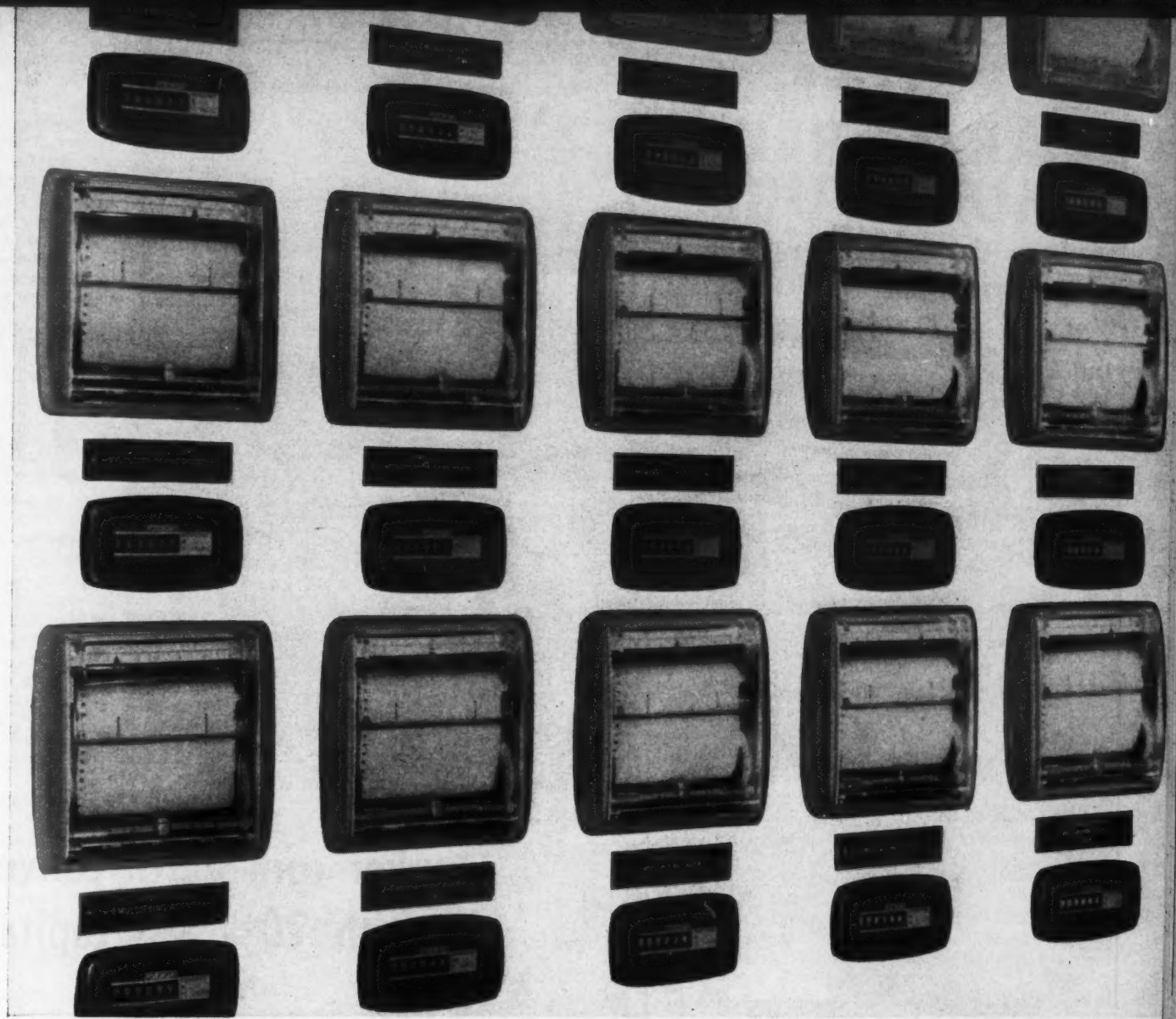
Its light weight prevents collapse of dinosaur's skeletal ridge, which is not very sturdy when reconstructed.

Film, 40 ft wide, covers skeleton which is 76 ft, 10 in long and stands 14 ft, 8 in high at the hips.

Three-element compound

Indium arsenide phosphide is the name of new compound designed to aid in direct conversion of heat into electricity at high temperatures. Semi-conductor material is prepared by chemically combining high-purity indium with equally pure arsenic and phosphorus.

For more information on product at right, specify 3850 see information request blank opposite last page.



On this centralized Foxboro panel, Type 14A Integrators provide continuous totalizing of significant process and plant service flows – recorders give trend records required by operating personnel.

Simplest way to get continuous, accurate totalizing

of all process and plant service flows

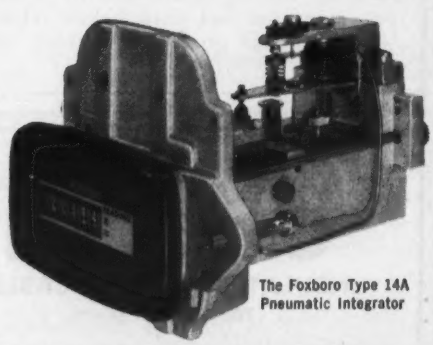
For automatic flow-accounting of all process and plant service fluids, Foxboro Type 14A Pneumatic Integrators offer unparalleled advantages of accuracy, convenience, and economy.

Easily connected to signal lines from new or existing Foxboro d/p Cell* Flow Transmitters, 14A Integrators provide **continuous** totalizing of significant flows. They can be mounted with the d/p Cell at the point of measurement, or panel-mounted hundreds of feet away.

The square root function is automatically extracted — flow totals are read directly. A simple, inherently accurate, centrifugal force system eliminates the errors of cams, special chambers, linkages, and intermittent counting.

Bulletin 13-23 fully illustrates and describes the Type 14A Pneumatic Integrator, and points the way to economical accounting of process and plant service flows. Write for your copy today. **The Foxboro Company, 819 Neponset Ave., Foxboro, Mass.**

*Reg. U.S. Pat. Off.



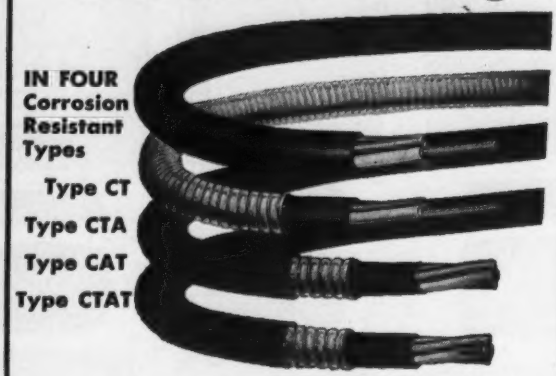
The Foxboro Type 14A Pneumatic Integrator

FOXBORO

REG. U.S. PAT. OFF.

CRESCENT ARMORED MULTITUBE

Solves Corrosion Problems For Instrument Tubing



For Pneumatic and Hydraulic Instruments and Control

Crescent Armored Multitube® consists of long-length copper, aluminum or polyethylene tubes twisted together to permit bending without distortion. In each layer, one tube is a bright blue color, affording a fast means of identification from both ends.

Type CT—For damp or corrosive locations where a moderate degree of mechanical protection to the tube is required. It employs a corrosion-resistant thermoplastic sheath, resistant to water, acids, alkalies, oil, and is flame-retardant.

Type CTA—Where maximum mechanical protection is desired during and after installation, such as direct burial in concrete and for pulling into conduit.

Type CAT—For protection against corrosion to the armor and to the tubing.

Type CTAT—Combining the advantages of Types CTA and CAT, the fourth type illustrated has the polyvinyl chloride thermoplastic sheath both under the armor and over the armor, thus providing maximum mechanical and corrosion protection.

Available in long runs from 2 to 37 tubes of copper, aluminum and polyethylene tubing in sizes ¼" O.D. This product is licensed under U. S. Patent No. 2,578,280.

Plastic Coated Single Tubes, copper or aluminum should be used to give corrosion protection to all single lines up to the final tube fitting, where trouble from corrosion may occur.

Send for New Bulletin No. 458-E

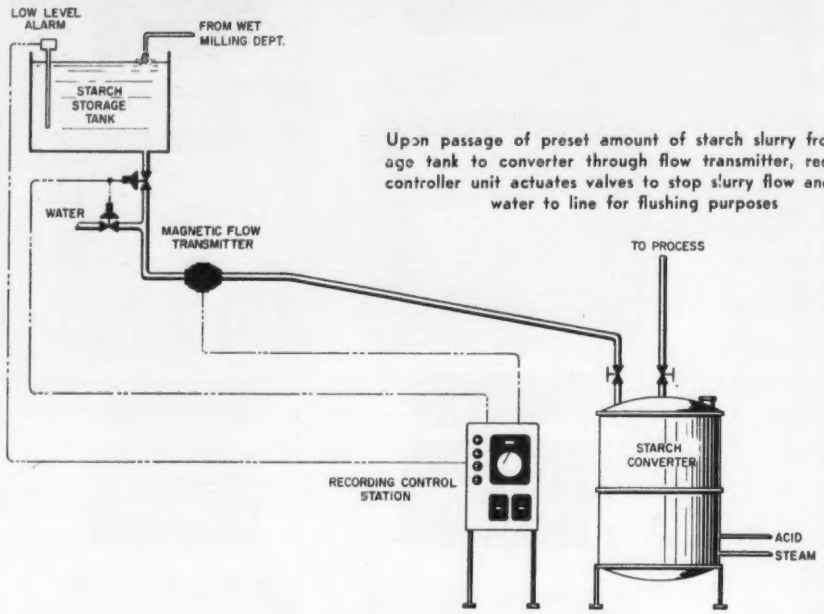
CRESCENT

INSULATED WIRE & CABLE CO.

TRENTON, 5, N. J.

Check 3851 opposite last page.

CHEMICAL PROCESSING — PROCESS INSTRUMENTATION *Fifth Annual Feature*

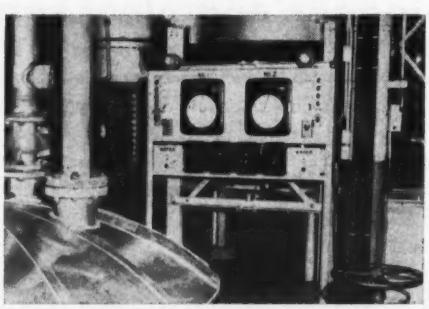


Upon passage of preset amount of starch slurry from storage tank to converter through flow transmitter, recording-controller unit actuates valves to stop slurry flow and admit water to line for flushing purposes

In switch from batch to semi-automatic process for conversion of corn starch, measuring-tank replacement was avoided. Result:

Quicker corn-starch conversion with 20% less capital

Problem: Proposed switch from batch to semi-automatic corn-starch-conversion process required metering-control system to feed exact amounts of starch slurry direct to converters, in syrup manufacture at Corn Products Department of Anheuser-Busch, Inc. of St. Louis, Missouri.



Recording-control station is nerve center of semi-automatic process for conversion of corn starch in syrup manufacture

Need for replacement of two measuring tanks, used to determine amount of starch slurry slated for each batch, triggered decision to convert to a semi-automatic system.

In batch system, slurry was drawn from storage tank into measuring tanks where volume was visually observed. Slurry was then processed to syrup in batch converters, by heating under pressure in presence of acid.

Solution: Two magnetic-type flow transmitters were installed in lines from storage tank to replace measuring tanks as method of metering starch-slurry feed to converters.

Voltage signal, generated in transmitters by flow of slurry, is delivered to recording-controller units where it can be visually read on chart. When preset amount of starch slurry has passed

through transmitter, controller closes valve in slurry line.

Simultaneously, controller opens valve which admits water to slurry line. Line is thus flushed from tank to converter. This precludes choking of line. Since water is normally added to batch, flushing stream is allowed to enter converter. Valve is automatically closed by controller upon completion of flushing.

If starch-storage-tank level reaches certain low-level point, signal light at recording-control station is actuated. In this manner, operator is warned not to start a conversion until sufficient amount of starch is available.

In each transmitter, liquid to be metered flows through straight non-magnetic tube. Tube has electrically insulated liner. Two electrodes are mounted flush with inner wall. Two electromagnets are on outside of wall. Flow of conductive liquid through magnetic field generates voltage which is sensed by electrodes and conducted to receiver-controller unit.

In pre-installation testing, over 100,000 gal of 43.5%-solids starch slurry was passed through transmitter into tank. When flow was complete, integrator of instrument read 20 gal higher than tank volume. This accuracy (0.02%) is better than established accuracy of volume test.

Meter was shown to be unaffected by changes in density, temperature, pressure, viscosity, or chemical composition of liquid being measured. During testing, specific gravity of starch slurry varied from 1.189 to 1.199 without affecting transmitter.

Results: Metering-control system has provided more consistent accuracy and repeatability than did batch system. Also, starch slurry is delivered more quickly to converters. Cost of installed system was 20% less than estimated cost of replacing measuring tanks with new stainless-steel vessels.

(Magnetic flow transmitter is product of The Foxboro Company, Foxboro, Mass.)

Check 3852 opposite last page.

A gauge glass installed... and two more on the shelf

Make short work of gauge glass replacement—when the replacement is as near as your stockroom shelves. You'll cut down time.

Take *three* gauge glasses the next time you order from your distributor. That gives you *one* for the gauge right away, a *second* for regular replacement, a *third* to cover special emergencies.

And here's another tip—don't rely on any old type gauge glass. Insist on regular replacement with PYREX®, CORNING®, or MACBETH® to avoid trouble.

These gauge glasses last longer—because they're harder to break! They stand up better to just about every clouding hazard. They easily resist high temperatures and high pressures.

One of these brands is just right for your gauge. Get some from your regular mill supply dealer. And remember—ask for *three* for each gauge!

(Corning makes sight glasses, too—from tough PYREX brand glass. Use them whenever you must see what's going on inside your processing equipment. Your distributor has them.)

Corning means research in Glass **CORNING GLASS WORKS, Corning, N. Y.**

Check 3853 opposite last page.

Quick problem solution by compact computer

Uses: Solution of problems whose magnitude or complexity do not justify use of large, general-purpose precision analog computer.

Features: In problems where constant value is solution desired, nullmeter on control panel provides acceptable answer. Precision potentiometer is provided with nulling system, whereby solutions can be read to three place accuracy.

Description: Analog computer uses fully transistorized

Transistorized analog computer can be utilized in problems where constant value is solution desired

computing components. They are housed in 15 x 17 x 24" high cabinet.

Solid state circuits are utilized by computer. Average power requirement is 15 w at 100v 50-60 cy. When continuously varying results must be plotted against time, two-channel strip-chart recorder is needed.

(Pace TR-10 analog computer is product of Electronic Associates, Inc., Long Branch, New Jersey.)

Check 3854 opposite last page.

Maximum-minimum control of unit processes

Uses: Maximum or minimum condition control of process curves.

Features: To find maximum, controller need only approach from one side, once. Control action is stable.

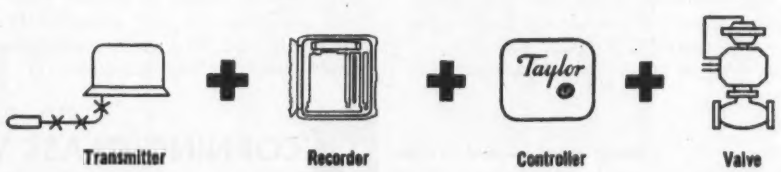
The best Control System is the one

Taylored

to your Control Problem

INSTRUMENT SOCIETY OF AMERICA

PNEUMATIC SYSTEMS



475 years of Cumulated Experience will be at Your Service in Taylor Booths 444 and 545 at the ISA Show

WHETHER you are interested in a complete control system, or in one of our new developments, the team of top Taylormen listed here will be at the ISA Show in Chicago to consult with you.

Drawn from our Application Engineering, Design Engineering, and Sales Departments, these men have behind them many years of experience in instrumentation throughout the processing industries. They are responsible for the enviable reputation that Taylor is earning around the world . . . a reputation for vision and ingenuity in working out successful solutions to tricky control problems.

You will see the most advanced models in both pneumatic and electronic instrumentation on display. Many of them will be demonstrated as working models.

Here is an opportunity to tap a storehouse of information on all aspects of process control. Consultation with these men will cost you nothing—it may save you much.

• • •

Taylor Instrument Companies, Rochester, N. Y. and Toronto, Ont.

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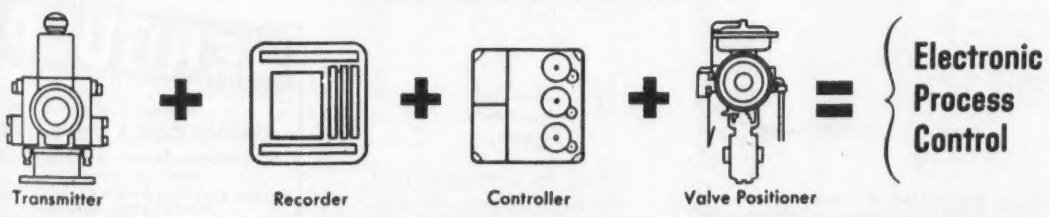
Taylor Instruments **MEAN ACCURACY FIRST**

ELECTRONIC SYSTEMS



Check 3855 opposite last page.

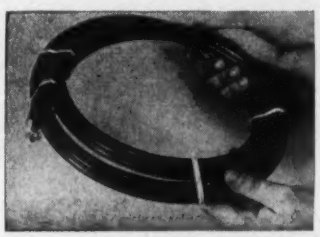
Description: Maximizing control mode forms basis of simplified form of computer control. Control unit is on unit-process basis rather than that of all inclusive plant. Each controller has single output. It changes single process input variable. For two or three process inputs, controllers may be paralleled or time-shared.

Essentially unit operates on experimental prediction basis. Controller makes small change in process and determines its further action on actual vs predicted value of process output.

If any malfunctions occur, controller disconnects itself from process but leaves process at its last set-point. Alarm is automatically given.

(Maximizer 760 W is product of Quarie Controllers, Box 59, Canton, Mass.)

Check 3856 opposite last page.



Instrument-air carriers

Chemical processing plants, refineries, and other automated industries should obtain more economical, dependable pneumatic control systems with polyethylene tube packs recently introduced. Packs contain from two to 37 color-coded, small-diameter air pressure tubes. Jacket of Geon vinyl protects interior tubes from external damage and aids in installation.

(Polyethylene tube packs are product of Pyramid Plastics, Inc., 554 W. Polk, Chicago, Illinois.)

Check 3857 opposite last page.

(Geon vinyl resin is supplied by B. F. Goodrich Chemical Co., Div. of B. F. Goodrich Company, Akron, Ohio.)

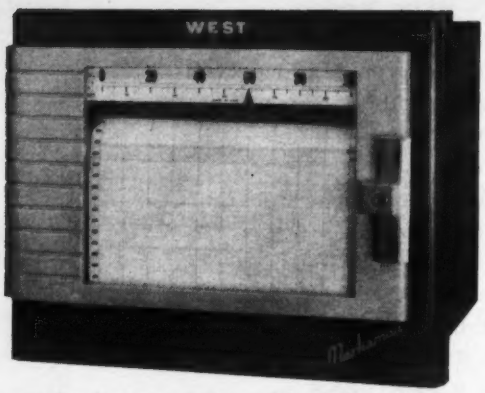
Check 3858 opposite last page.

Still hitched to horse-and-buggy recorders?

Boost volume...
assure quality...
control costs
with

Marksman

Tubeless Strip-Chart Potentiometer Recorders



Transistorized, these precise instruments avoid *all* the notorious tube-troubles. Needing no warm-up, adjustment, replacement of tubes or repair of their circuitry, Marksman recorders permit immediate and *continuous* operation...so increase production.

Accurate within 1/5th of 1%, they also include several special features which provide for more user-convenience and consistent quality-control. Users in many lines report Marksman recorders involve less operational cost, as well as reducing waste of other factors.

Let our world-wide service help on your own job. Phone your West consultant (see Yellow pages) or write Chicago office for Bulletin M.

WEST Instrument CORPORATION
SALES OFFICES IN PRINCIPAL CITIES
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4351 W. MONTROSE, CHICAGO 41, ILL.
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WEST INSTRUMENT, LTD.
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the trend is to **WEST**

Represented in Canada by
DAVIS AUTOMATIC CONTROLS, LTD.

Check 3859 opposite last page.

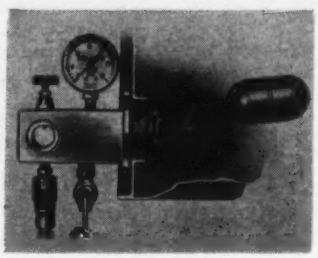
INSTRUMENTATION

Meters liquids directly from shipping drums

Uses: Meters light or viscous liquids directly from drums.

Features: Feeder operates by gravity feed with light liquids, or by available vacuum, pump suction, or compressed air for very viscous flow.

Description: Proportioner



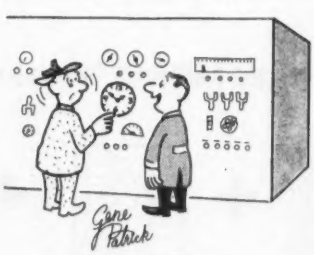
Chemical proportioner attaches to drum

fits into 2" bung of steel shipping drums through 55 gallons, and either separately or simultaneously meters light to viscous chemicals at drops/hr through sight glass. It also batch-pours through built-in faucet provision.

Assembly includes automatic "empty" indicator gage and air-tight flow shutoff. Snap-type coupling simplifies drum changing. Accessory fittings permit remote drum location for many applications.

(Pour-Portioner is development of Sterling E. Norcross Companies, 19 Osborne St., Bloomfield, N.J.)

Check 3860 opposite last page.



"Well, by looking at that complicated dial, it's possible for me to tell the time of day."

New Improved JERGUSON Gage Illuminator

gives up to 3 times the illumination

Low cost explosion-proof lighting of entire gage glass with no glare or blind spots

New Features:

Simplified Relamping . . . loosen one thumb screw to lift out cover and glass housing in one piece.

New Safety Chain prevents accidental dropping.

Now both UL and CSA Approved.

Easily mounted on back of Transparent Gage.

The New Jerguson EPL-56 Illuminator gives three times the illumination (and 3 times the bulb life) . . . a bright, evenly diffused light over the entire length of gage glass, thus enabling you to see the liquid level clearly and easily under all conditions. Relamping is simplified: one turn of the thumb screw and you lift out cover and glass housing in one piece.

Jerguson Illuminators incorporate the principle of solid wedge lighting. Illumination from a single bulb is reflected from the angular surface of the plastic wedge and is evenly diffused through the transparent gage glass.

Jerguson Illuminators are UL approved and are built in accordance with their Standard for Electric Lighting Fixtures for use in hazardous locations for Class I, Group D Services. They are made in a variety of sizes.

Write for Data Unit on Process Gage Illuminators.

JERGUSON
Gages and Valves for the Observation of Liquids and Levels
JERGUSON GAGE & VALVE COMPANY
100 Adams Street, Burlington, Mass.
Offices in Major Cities
Jerguson Tress Gage & Valve Co., Ltd., London, Eng.
Pétrole Service, Paris, France

See Booth 512 — ISA Show

Check 3861 opposite last page.

CHEMICAL PROCESSING PROCESS INSTRUMENTATION *Fifth Annual Feature*

Aerosol purity proved by gas chromatography

. . . which detects 0.01% foreign-agent content to help operators maintain 99.9+% purity

Gas-chromatography analyzer provides refrigerant and aerosol-propellant process operators with data enabling them to maintain better than 99% product purity

Problem: Highly accurate purity data are required in refrigerants and aerosol propellants produced at the Calvert City, Kentucky, Isotron plant of Pennsalt Chemicals Corporation.

Increasing use of aerosols in food and drug industries predicated need for high purities. Without dependable, accurate impurity data as basis for operation of process controls, such levels could not be consistantly obtained.

Solution: A gas-chromatography analyzer was utilized to periodically provide data for operators to utilize in resetting process control points to maximize purity.

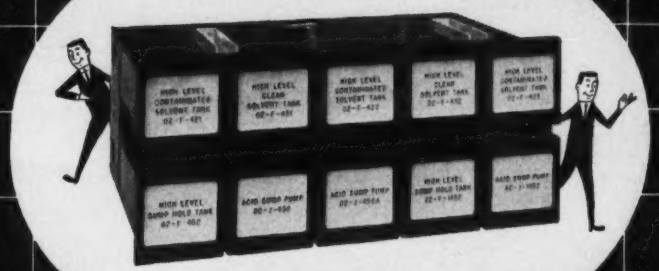
Instrument is connected directly into process stream a few feet from control room. It provides readings every 10 minutes.

Chromatography instrument consists of three components—programmer, recorder, and analyzer. Strip-chart recorder can draw either bar record or spectrum of analysis results. Programmer controls instrument. It admits sample streams

SCAM®

DE-LINE

THE ENGINEER'S



ANNUNCIATOR

GREATEST FLEXIBILITY IN THE FIELD

Available In Many Sequences

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BACK-LIGHTED NAME PLATE

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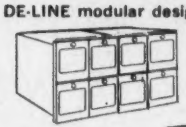
Twin-point can replace single point in field with no change in cabinet wiring.

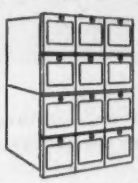
Side By Side Or Stacked

DE-LINE modular design retains original custom cabinet appearance as system grows.

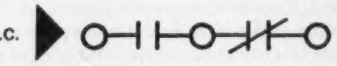


You save up to 50% panel area and still have full size legend plates.

DE-LINE plug-ins are self-policing.



AUXILIARY CONTACTS N.O.—N.C. standard with most plug-ins.



SAME PLUG-IN operates from N.O. or N.C. trouble contacts.

SEQUENCE OPTION after installation by means of independent slide switch at each point.

Send For Catalog No. 659

THE SCAM INSTRUMENT CORP.

DEPT. K, 1811 West Irving Park Road
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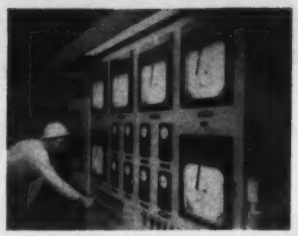
See Us At The Instrument Automation Exhibit in Chicago — Booth 350

Check 3862 opposite last page.



These Bristol instruments at Lithium Corporation of America, Bessemer City, N. C., are part of an extensive installation that keeps tabs on such variables as temperature, pressure, absolute pressure, flow, liquid level, and pH.

Almost every industry can benefit from BRISTOL INSTRUMENTATION

Here's an outstanding example of the way Bristol is helping thousands of industrial processes today:

In Lithium Corporation of America's plant for extraction of vital lithium compounds, located in Bessemer City, North Carolina, near this nation's largest ore deposits, precision Bristol instruments monitor and control practically every step of the extraction process.

From the early planning stages, Bristol instrument engineers worked closely with Lithium Corporation engineers in designing the instrument system for this modern plant. Temperature, pressure, absolute pressure or vacuum, flow, liquid level, and pH had to be recorded or controlled at a multitude of points in the complex extraction process. The Bristol instruments used included electronic Dynamaster* potentiometers and pyrometers, pneumatic and time program controllers. In operation for nearly four years now, the Bristol instruments have been doing a precise job of recording and controlling despite vibration and a corrosive, dusty environment.

This is just one example of the way Bristol can work with you in selecting the *right* instruments for your process. Bristol makes the most complete line on the market of full-size and miniature instruments for measurement, recording, automatic control and telemetering of almost every industrial variable. And Bristol Application Engineers are always ready to advise and assist you in applying them to your process. Write: The Bristol Company, 141 Bristol Road, Waterbury 20, Conn.

*T.M. Reg. U. S. Pat. Off. 8.48

BRISTOL TRAIL-BLAZERS IN PROCESS AUTOMATION

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Check 3863 opposite last page.

and adjusts the full-scale range of each component through continuously adjustable attenuators. Programmer also advances recorder chart 0.1" between components, and any desired distance between streams.

Analyzer unit is housed in explosion-proof case. It contains linear valve, temperature controller, column, and solenoids. Unit is hanger-mounted away from recorder and programmer.

Modified Wheatstone bridge is used in measuring circuit of analyzer. Detectors are thermal-conductivity cells. Stream components separate in column. They appear at detectors as measurable binary mixture of component in carrier gas.

Results: Impurity levels as low as 0.01% are detected by instrument. Data thus provided have enabled operators to maintain purity of better than 99%. Comparison of this data with that from conventional laboratory chromatography analyzer, during first few months of operation, proved out accuracy of instrument. Standard-sample check is now conducted once each week.

Only routine maintenance has been necessary. This includes renewal of chart paper and ink and changing of gas cylinders. A major change to Pennsalt is that the equipment can accommodate any of their process changeovers.

(Chromomax® gas-chromatography analyzer is product of Leeds & Northrup Company, 4901 Stenton Ave., Philadelphia 44, Pa.)

Check 3864 opposite last page.

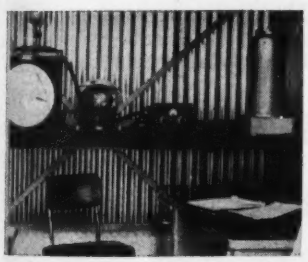
Hold reformer efficiency in hydrogen generation with infrared

Problem: Fundamental ammonia synthesis at Collier Carbon & Chemical Corp., Brea, Calif., is dependent upon supplies of nitrogen and hydrogen gases. A critical preliminary step is catalytic reforming of methane with steam, at high temperature, to obtain necessary hydrogen

gas. Optimum conversion is accomplished when residual methane from reformer is approximately 4%. Less than this amount shortens life of catalyst and reformer tubes. Too much wastes materials.

Solution: To monitor methane stream from reformer, Collier installed an infrared analyzer. Analyzer operates by measuring change in infrared spectrum caused by variations in stream composition. Compressed gas from two cylinders is used to periodically calibrate instrument. Pre-purified nitrogen is used for zero standardization. A precise mixture of 96% nitrogen and 4% methane is used for up-scale standardization.

Steam and natural gas are fed to reformers. A special sample-handling system takes sample from outlet of either of two parallel process streams. Sample is cooled, dried, and continuously analyzed. Sample flow is controlled to 1 cu ft/hr by a needle valve at instrument vent. Deviations in methane content are compensated for by operator who adjusts necessary process variables.

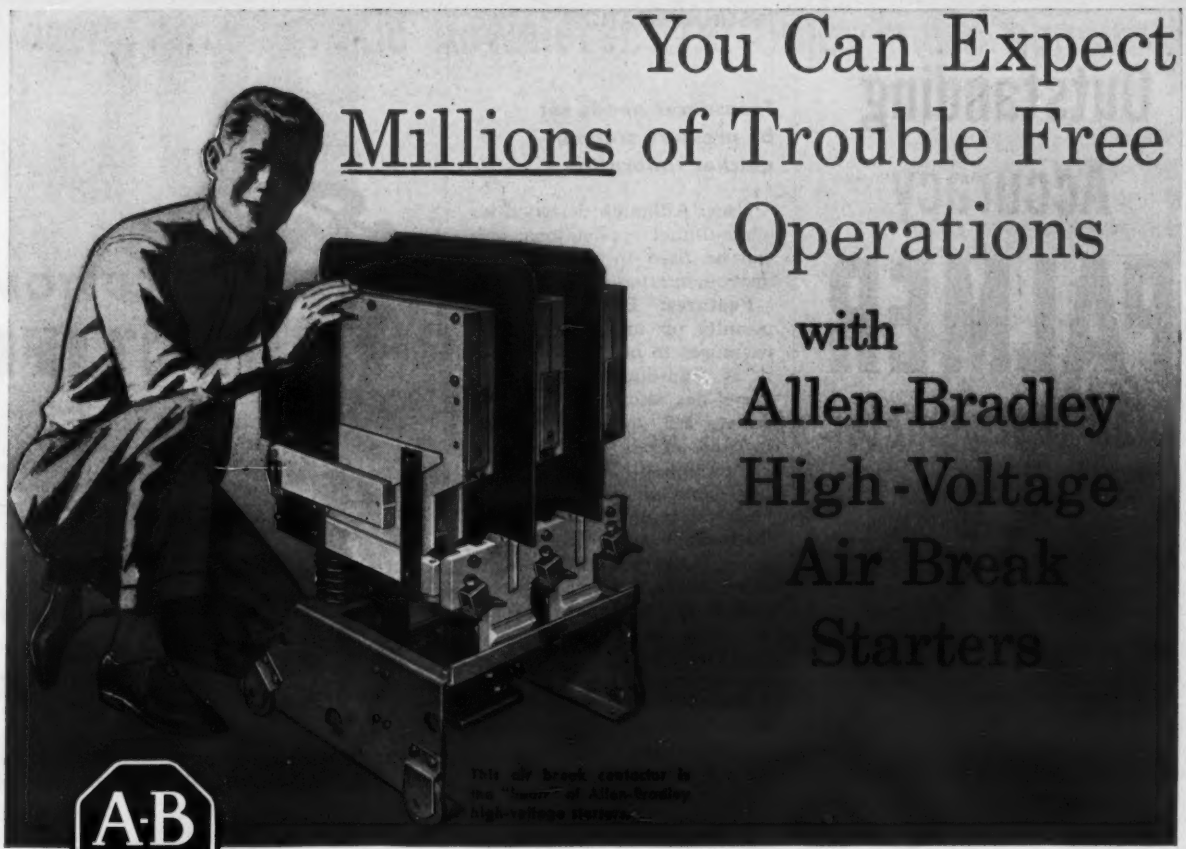


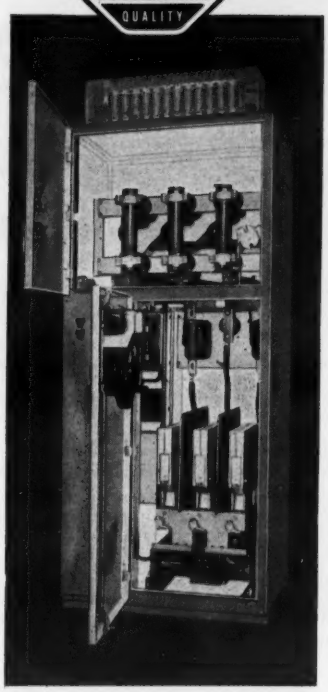
Infrared analyzer (right) and recorder (left) help assure efficient ammonia production at Collier Carbon and Chemical Corp.

Results: Instrument has been in use at Collier Chemical Corporation for over two years, providing a reliable, accurate, and important element in control of their 85,000 ton/yr ammonia plant.

(Model 21 analyzer is product of Beckman/Scientific and Process Instruments Div., Beckman Instruments Inc., 2500 Fullerton Road, Fullerton, California.)

Check 3865 opposite last page.



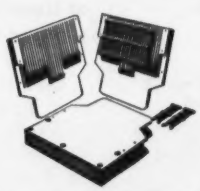


Bulletin 966 high-voltage air break across-the-line synchronous motor starter in NEMA Type 1 enclosure. All A-B high-voltage starters are equipped with current limiting fuses.

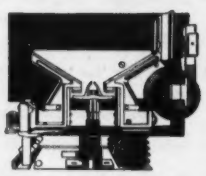
For the petroleum and chemical industry—where tough jobs are the normal routine—there's nothing to match these A-B high-voltage starters. Their simple solenoid contactor—with only ONE moving part—assures an operating life that will *amaze* even the most skeptical. The silver alloy contacts are always in perfect operating condition—no filing or "dressing" is necessary.

These new air break starters are made for all types of motors and for every service—up to 1500 hp, 2300 volts; 2500 hp, 4600 volts. Get the complete story. See how it is possible for these A-B starters to take the punishment of frequent switching, jogging, and plugging. Send for Publication 6080.

Only One Moving Part
Simple solenoid design eliminates trouble-causing pins, pivots, and flexible jumpers.



Faster Arc Suppression
New blowout design and unique arc chute. Chutes are molded from a new arc resistant material.



Double Break Contacts
of silver alloy never need maintenance. Vertical motion assures uniform contact pressures.

Allen-Bradley Co., 104 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

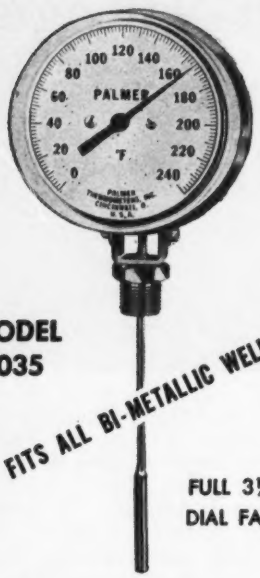
ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

Check 3866 opposite last page.

Outstanding Accuracy

PALMER

Dial Thermometer



Check these functional features

- Direct-drive Bourdon Coil with a filled system for longer lasting accuracy.
- Stem can be placed at any desired angle and case can be rotated to most readable position.
- External calibration for zero setting.
- Unaffected by stem alignment.
- Accurate to one scale division.
- No sticking at any temperature.
- Non-corrosive case.

PALMER

THERMOMETERS, INC.

Mfrs. of Industrial Laboratory, Recording and Dial Thermometers

2515 Norwood Ave., Cincinnati 12, O.

Check 3867 opposite last page.

Transducer needs cut by pressure scanner, quicker calibration

Uses: Although designed for wind-tunnel applications, unit can be used in any pressure instrumentation system.

Features: Design of unit permits up to 160 individual pressures to be read with only 16 transducers. Instrument saves not only cost of transducers but considerable time in calibration.

Description: Pressure scanner consists of four rotors each accommodating four flush-diaphragm transducers, four stators with 40 pressure-line inputs each, a motor, switching mechanisms, and electrical and pressure connections. Scanner is designed for pressures from 0 to 100 psia on pressure inputs, from 14 to 100 psia on reference pressure lines, and from 0 to 75 psia on vent lines.

Made of stainless steel and anodized aluminum, the instrument is 20″ long, 6″ wide, and 4″ high.

(SP-105 pressure scanner is a product of Datex Corporation, 1307 S. Myrtle Ave., Monrovia, Calif.)

Check 3868 opposite last page.

Radiation senses level of liquids in this rugged switch

Unit does not contact liquid in tank or vessel

Uses: Providing high- and/or low-level alarm actuation in liquid storage tanks or vessels.

Features: Meeting need for extreme simplicity and ruggedness, switch uses radiation energy to sense liquid level. It does not come in contact with material in tank.

Description: Standard Gamma-switch consists of a Geiger-Mueller tube which detects gamma radiation change when liquid level drops or rises and through a transistorized integrating circuit applies voltage to a thyratron relay grid. Thyratron actuates an "on-off" adjustable limit

RUGGED

Sel-Rex®

CUSTOM ENGINEERED

RECTIFICATION

- *Germanium*
- *Silicon*
- *Selenium*

Underwater for three days during a recent New England flood,* two Sel-Rex Rectifiers operated perfectly after a superficial cleaning. Now we don't recommend running Sel-Rex Rectifiers underwater—but this incident typifies the rugged dependability you get with all Sel-Rex Metallic Power Rectifier Equipment.

Send for FREE "GUIDE" to industrial rectifier equipment.

***We do make a model for underwater operation.**

Rectifier Division

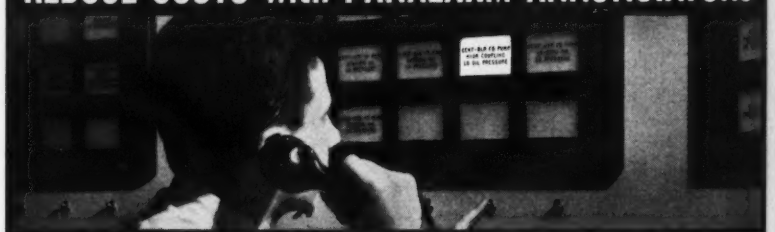
SEL-REX CORPORATION

NUTLEY 10, NEW JERSEY — Representatives in Principal Cities

Complete Semiconductor Power Conversion Systems for any AC to DC application

Check 3869 opposite last page.

MOST MAJOR U.S. CHEMICAL PRODUCERS REDUCE COSTS with PANALARM ANNUNCIATORS



MAXIMUM INFORMATION on all process variables . . . the result of 10 years system engineering by Panalarm and major chemical producers. That's why Universal Series 50 is the chemical industry's most informative annunciator. Trouble anywhere is signalled instantly—*before* it can grow big and expensive. "Off-normals" are pinpointed instantly, accurately for fast remedial action, reducing costly downtime.

Economical, highly flexible design facilities system expansion. Can be simply adapted to your exact requirement, avoiding costly custom designing. Proven components—e.g., almost 1,000,000 dependable Panalarm developed relays have been used in Panalarm Annunciators.

Ask your nearby Panalarm sales engineer to show you why Universal Series 50 is the chemical industry's No. 1 annunciator choice . . . how its adaptability and reliability can help increase your profits . . . by producing maximum information and reducing costly downtime. No obligation, of course.

Write for Catalog 100 B today.

PANALARM®

Division of

PANELLIT, INC.

7401 No. Hamlin Ave., Skokie, Ill.

Check 3870 opposite last page.

latching relay to operate alarms of various kinds. Radium, cesium-137, or cobalt-60 are source of radiation energy and are sealed in a lead-shielded holder equipped with locking shutter.

Switch components are sealed in a 4½" diameter schedule 40 carbon steel explosion proof enclosure. Length is 21"; weight is 30 lb; power required is 115 volts AC, 60 cycles, 0.5 amp.

(Model GM-7 Gamma-switch and accessories are manufactured by The Ohmart Corporation, 2236 Bogen St., Cincinnati 22, Ohio.)

Check 3871 opposite last page.

Accuracy is guaranteed to ± 0.25% of scale in instruments

Units record and/or control many process variables

Uses: Indicating, recording, and/or controlling any process variable convertible to voltage or resistance change. Applications include conductivity, flow, humidity, pressure, temperature measurement, and many others.

Features: Instrument accuracy is guaranteed to ±0.25% of scale or 5 microvolts. Sensitivity is ±0.125%, unaffected by line voltage fluctuation, component, or amplifier tube change.

Description: Electronic indicating recorders and indicating recording controllers have a stability of ±1 microvolt. Power gain is 135 decibels, and voltage gain is 100 million at rated load. Basic control action is two position (on-off) but can be adapted to three position control to lag or lead control set-point over entire range. Up to six alarm contacts can be provided for remote indication or external safety requirements. Fail-safe action is provided for either up- or down-scale travel.

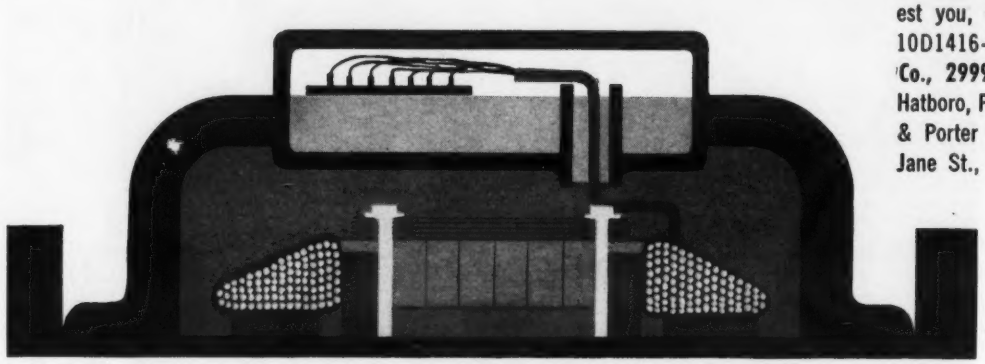
(Thermo electronic indicating recorders and indicating recording controllers are products of Thermo Electric Co., Inc., Saddle Brook, N. J.)

Check 3872 opposite last page.

new F&P magnetic flowmeter 200 times more sensitive

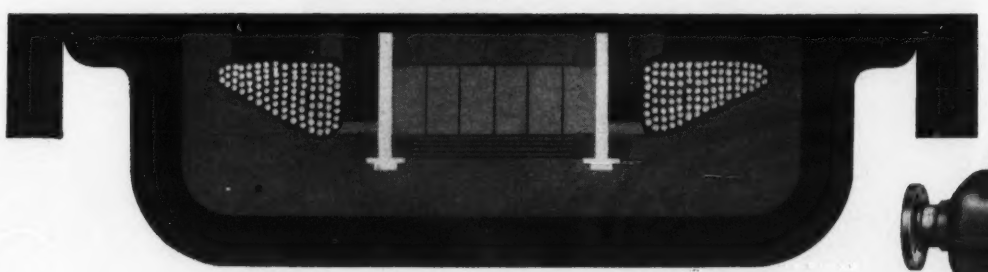
Low-conductivity liquids meet their master in F&P's new magnetic flowmetering system. In one big technological jump, this new magnetic meter leaves all others behind . . . metering liquids and slurries with conductivities as low as 0.1 micromho per cm. Completely free of all obstructions, this versatile instrument provides accuracies better than ±1% of flow—independent of viscosity, density, turbulence, or changes in liquid conductivity.

Get all the facts on the world's most versatile flowmeter —the F&P Magnetic Flowmeter. Contact the F&P field engineer nearest you, or write for Catalog 10D1416-1. Fischer & Porter Co., 2999 County Line Road, Hatboro, Pa. In Canada, Fischer & Porter (Canada) Ltd., 2700 Jane St., Downsview, Ontario.



ACETALDEHYDE • ANHYDROUS AMMONIA • BENZYL ALCOHOL • DISTILLED WATER • FORMIC ACID

HYDROGEN CYANIDE • ISOPROPYL ALCOHOL • LIQUID PHOSPHORUS • O-TOLUIDINE • SULFONIC ACID • URIC ACID



FP

FISCHER & PORTER COMPANY

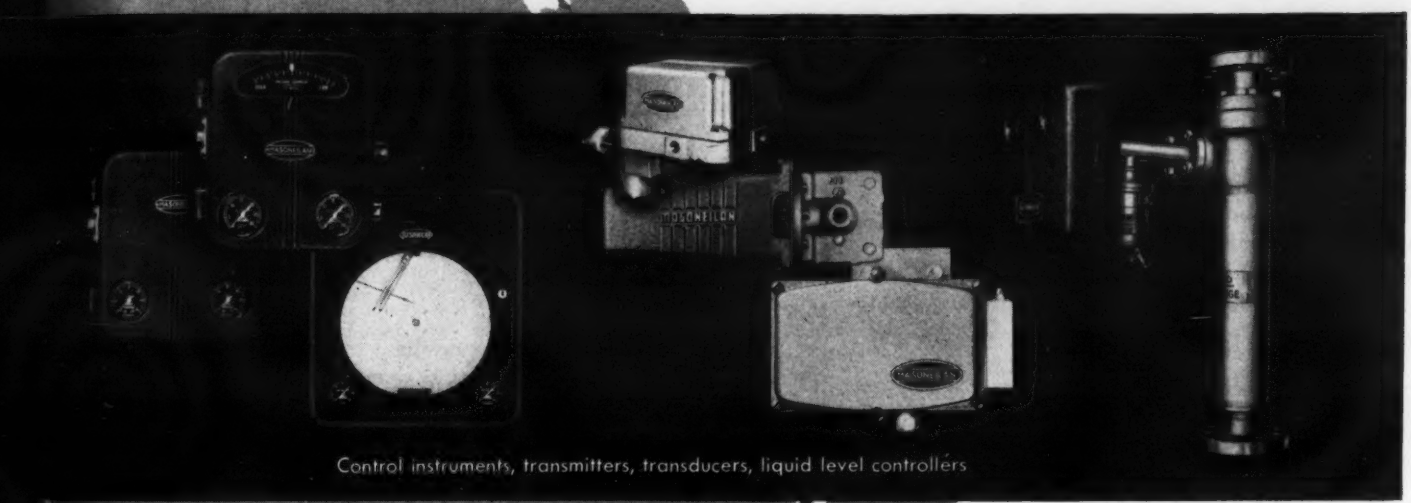
COMPLETE PROCESS INSTRUMENTATION

Check 3873 opposite last page.

NOW! two new pressure regulators
4"
MASONEILAN
STEEL

With Mason-Neilan Controls...

Standard Versatility... Modern Approach to Cost-Saving Control

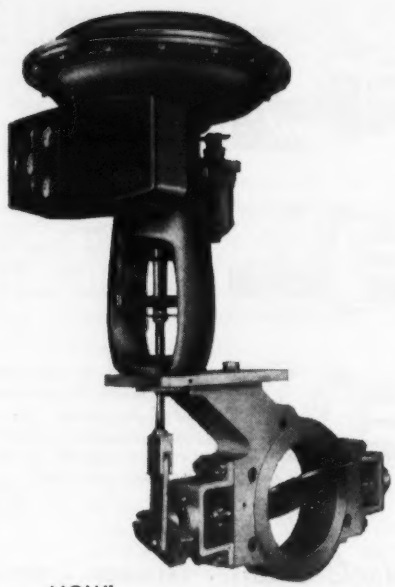


Control instruments, transmitters, transducers, liquid level controllers

The designed-in versatility of major Masoneilan product lines permits a selection of *standard* control equipment for all usual installations and many of the tougher applications.

- **Control Valves:** an exceptionally wide variety of body styles and trim types (many of them interchangeable) enables you to obtain the best combination for your particular service.
- **Indicating, Recording and/or Controlling Instruments:** built from unit subassemblies; permits the selection of desired components for the pneumatic control action or function desired.
- **Transmitters:** interchangeable primary elements simplify the transmission of pressure or temperature, flow or level measurement.
- **Positioners:** pneumatic or electropneumatic positioners and/or electropneumatic transducers offer a choice for either pneumatic or electric control systems.
- **Butterfly Valves:** the versatile butterfly valve line permits multiple variations by simple rearrangements of linkage; choice of actuator types, liners, seating or nonseating designs and mounting styles.

This "standard" versatility of Masoneilan products results in lower maintenance costs and reduced delivery delays. It will pay you to learn how this versatility can be adapted to *your* advantage. Call a Mason-Neilan representative or write for catalog.



NOW!
new developments in Masoneilan Butterfly Valves — soft seats, angle seating, body liners, actuators

MASON-NEILAN

Division of Worthington Corporation

25 NAHATAN STREET, NORWOOD, MASSACHUSETTS

District offices or Distributors in principal cities in U.S.

In Canada: Mason-Neilan, Division of Worthington (Canada), Ltd.

For more information on product at left, specify 3874 see information request blank opposite last page.

MN 9-22

DEKORON ARMORED INSTRUMENT HARNESS

4+4=16

TUBE MATERIALS + TUBE CONSTRUCTIONS = DIFFERENT TYPES

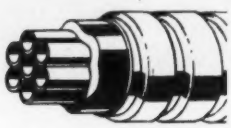
Yes, *four* different core tubing materials (copper, aluminum, polyethylene, nylon) combined with *four* distinct types of armoring give you *sixteen* different types of Dekoron Armored Instrument Harness from which to choose.

Designed specifically for instrument harness application, special Moore-Loc armor construction has almost twice the pull-apart resistance of ordinary armoring . . . has cord packing for extra resistance to moisture and fume penetration.

There's at least one best type of Dekoron for your installation. We help *you* select it; we're unbiased because we make all types. Now go Dekoron 100% for all your tubing needs. Think of Dekoron first . . . to last. That's *Dekoron—America's Premier Line of Armored Instrument Harness.* A-583A

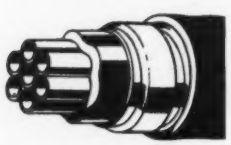
CONSTRUCTIONS

TYPE VA



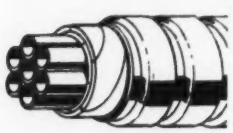
For Impact and Corrosion Resistance. Core tubes with vinyl sheath covered with Moore-Loc modified-square-lock construction armor with cord packing.

TYPE VAV



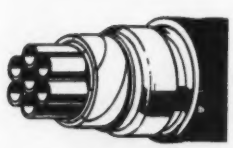
For Impact and Maximum Corrosion Resistance. Same construction as Type VA (*above*) but with outer vinyl sheath. 24-gauge galvanized steel armor gives maximum pull-apart and impact resistance.

TYPE A



For Impact Resistance in Dry Locations. Core tubes are wrapped in vinyl-impregnated insulating tape. Tape insulates and cushions core tubes inside metal armor.

TYPE AV



For Corrosion and Impact Resistance. Same construction as Type A (*above*) but with outer vinyl sheath. All four constructions available with metal or plastic core tubes.

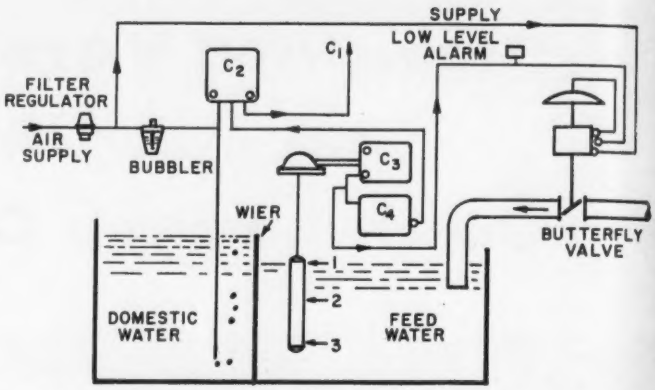
Dekoron® products QUALITY • RESEARCH • SERVICE

SAMUEL MOORE & COMPANY

DEKORON PRODUCTS DIVISION • MANTUA, OHIO

Check 3875 opposite last page.

CHEMICAL PROCESSING PROCESS INSTRUMENTATION *Fifth Annual Feature*



Rate-of-flow controller (C_1) governs flow of river water through filters to domestic-water sump. Feed-water-sump level information is fed from float through output-pressure transmitter (C_3) and receiver-controller (C_4) to pressure controller (C_2). Domestic-water-sump level data is passed by bubbler unit to pressure controller. Pressure controller overrides rate-of-flow controller to increase flow of river water to domestic-water sump upon decrease in domestic or feed-water levels.

When adjoining water sumps serve separate and distinct needs and have common source, water-level problem can be knotty. At one plant with automatic-control system . . .

Twin sumps supervised to share river source

An automatic-override-control system is being utilized at a processing plant of a large eastern chemical company to regulate rate of flow of river water through filters to domestic-water sump, in accordance with levels in both domestic-water sump and adjoining steam-plant feed-water sump.

Domestic supply serves process usage. Also it replenishes feed-water supply (by means of flow over weir between two sumps).

Amount of condensate returning from steam plant to feed-water sump is small. Accordingly, large quantities of makeup feed are required. When overflow from domestic-water sump cannot provide makeup, filtered river water is fed directly to feed-water sump.

Heart of system is reverse-acting rate-of-flow controller (C_1 in diagram). It is overridden to decrease river-water flow through filters upon increase in signal from pressure controller (C_2) and vice versa. Output of pressure controller is directly dependent upon pneumatic-signal input from receiver-controller unit (C_4).

Output-pressure transmitter (C_3) monitors feed-water sump level via pneumatic signal from float. Increasing water level produces increasing signal. Maximum signal is produced when water level is at point (1) on float. Signal from transmitter is reduced by receiver-controller to be-

come input to pressure controller.

Thus, decreasing feed-water level, even with maximum level in domestic-water sump, results in increased flow of river water into domestic sump. Resulting overflow replenishes feed-water supply.

Plant air supply is reduced to 20 psi by filter regulator. This pressure supplies bubbler unit. Bubbler system monitors domestic-water-sump level by means of pneumatic signal delivered to pressure controller. Maximum output signal is given when domestic water level is six inches below weir edge.

When bubbler delivers below-maximum signal this causes pressure controller to bleed off input pressure of receiver-controller (in amount of differential between maximum bubbler signal possible and actual bubbler signal). This reduces output signal from pressure controller to rate-of-flow controller by like amount.

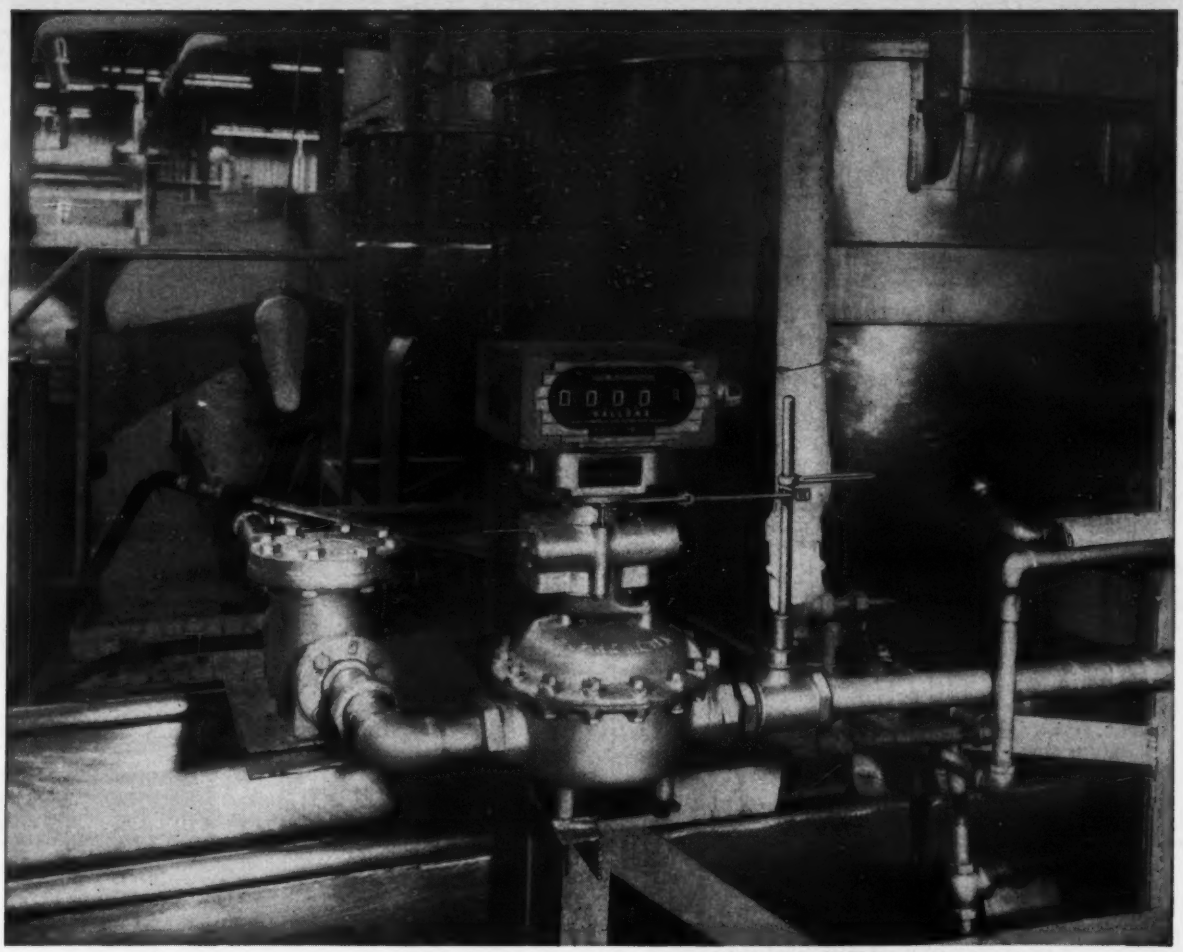
In this way, even with maximum feed-water level, decreasing domestic-water level results in increasing river-water flow to domestic-water sump.

Emergency direct flow of filtered river water to feed-water sump is controlled by diaphragm-actuated butterfly valve. Valve positioner receives pressure supply from filter regulator, which also supplies bubbler unit. Positioner is actuated to open valve when signal received from output-pressure transmitter falls below given value, corresponding with feed-water level at (2) on float.

Low-level alarm can be installed to give audible signal if received signal from output-pressure transmitter drops under value produced by feed-water level at position (3) on float.

(Diaphragm-actuated butterfly valve, pressure controller 4106U, output-pressure transmitter 2500T, receiver-controller 2506, and filter regulator 67FR are products of Fisher Governor Company, Marshalltown, Iowa.)

Check 3876 opposite last page.



Rockwell Model ER Meter with automatic quantity control shut-off in food processing plant

Batch it, blend it, or just plain account for it!

IT'S GOOD BUSINESS TO METER ALL LIQUIDS

Wherever liquids are stored, mixed or used in plant operations, you can save time, money and improve efficiency with Rockwell industrial meters. With meters you can batch, blend and control formulas with precision. Handling volatile liquids, metering provides the safety of a closed piping system and guards against contamination.

Rockwell industrial meters are valuable accounting tools. Thousands use them for in-plant cost identification purposes, for inventory control—even to guard plant security.

You can measure most any piped liquid with Rockwell meters—oils, liquors, paints, chemical solutions—over 50 liquids in all. Use the coupon for full details.

CLIP COUPON—MAIL TODAY!

INDUSTRIAL METERS

another fine product by

ROCKWELL

ROCKWELL MANUFACTURING CO.
Pittsburgh 8, Pa.

Gentlemen:

I am interested in measuring _____ (Name of Liquid)

Pipe Size _____ "

Working Pressure _____ psi Temperature _____ °F max.

Max. Flow Rate _____ gpm Min. Flow Rate _____ gpm

Your Name _____

Company _____

Street _____

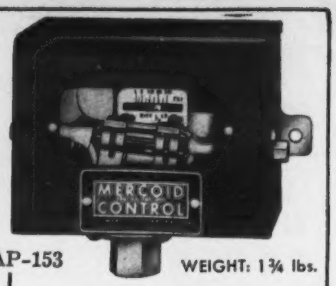
City _____ Zone ____ State _____

Check 3877 opposite last page.

NEW

SMALL, LIGHTWEIGHT

PRESSURE CONTROL



AP-153 WEIGHT: 1¾ lbs.

FOR MEDIUMS NOT INJURIOUS TO STEEL OR SILVER SOLDER

EXTERNAL ADJUSTMENT

CALIBRATED DIAL

HERMETICALLY SEALED MERCURY SWITCH

VISIBLE CIRCUIT

CASE: NEMA 1—Heavy gauge steel, cadmium plated. Steel cover (with glass front).

OPERATING RANGE

Adjustable Operating Range	Differential Fixed (Factory Set)	Maximum Surge Limits
1 to 20 psig	0.5 psig.	30 psig.

CIRCUIT

SP-DT HERMETICALLY SEALED MERCURY SWITCH (4A. 115V., 2A. 230V.)

Provides any of following operations:

1. *Single Pole—Cut-in high (close on rise)*
2. *Single Pole—Cut-in low (open on rise)*
3. *Single Pole—Double Throw*

WRITE FOR BULLETIN 02

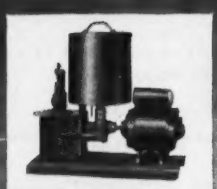
THE MERCOID CORPORATION
4201 BELMONT AVE., CHICAGO 41, ILL.

Check 3878 opposite last page.

precision metering

Manzel Chemical Feeders give accurate, dependable metering of chemicals, acids, oils and other liquids. Wide range of capacities, feeds and delivery rate.

MANZEL



Write for FREE Catalog giving complete information.

Manzel

274 Babcock Street
Buffalo 10, N. Y.

Specialists in metering pumps and lubricators since 1898

Check 3879 opposite last page.

INSTRUMENTATION

Flows are measured to ± 1% accuracy in true mass

Flowmeter handles gases at 40,000 lb/hr

Uses: Direct measurement of liquid and gas flow in pounds.

Features: Device measures weight of flowing fluids to accuracy within ±1% of reading over wide ranges of flow rate, pressure, temperature and density. This is done without additional measurements and corrections for these variables.

Description: Gyro-integrating flowmeter has three major components. These are flow-rate sensor, gyroscopic integrator, and six-digit cyclometer register. Unit weighs approximately 100 lb.

Specifications of flowmeter are as follows:

	Gases/Liquids
Flow rate, lb/hr	40,000/240,000
Operating range, % of flow rating	10-133
Operating-pressure rating, psig	1500
Ambient-temp range, °F	−20 to +125
Fluid-temp range, °F	0-165

(Type LB mass flowmeter is development of General Electric Company, Schenectady 5, New York.)

Check 3880 opposite last page.

(Type LB mass flowmeter will be marketed by Black, Sivalls, and Bryson, Inc., 7504 E. 12th St., Kansas City 26, Mo.)

Check 3881 opposite last page.

High resolution obtained with column, detector for fractometers

Combination expands range of chromatography

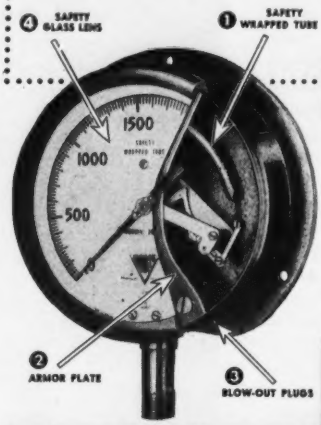
Uses: Combination of Golay column and ionization detector is supplied for use with vapor fractometers either as factory installed integral part or accessory package.

Features: High resolution and sensitivity provide resolutions heretofore impossible with conventional packed col-

KUNKLE GAUGES
for Process Applications

AVAILABLE IN MANY TYPES and SIZES
15 p.s.i., or 30" of vacuum, to 20,000 p.s.i.

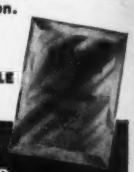
...and the NEW KUNKLE SAFETY CASE GAUGES



...safer because:

1. Rifle-bored steel Bourdon tube is safety wrapped.
2. Armor plate behind dial.
3. Blowout plugs located for downward relief.
4. Shatterproof dial lens.
5. Solid back gives full area protection.

by the MAKERS of DEPENDABLE KUNKLE VALVES



WRITE FOR CATALOG & ENGINEERING DATA

KUNKLE VALVE CO. • FT. WAYNE, IND.

Check 3882 opposite last page.

For Accurate TEMPERATURE RECORDS at MODERATE COST

RANGES AVAILABLE

Temperature Range	One Rotation of Chart
−30° to +120°F.	7 Days
−30° to +120°F.	24 Hours
−30° to + 50°F.	24 Hours
−30° to + 40°F.	7 Days
−10° to + 50°F.	24 Hours
−10° to + 50°F.	24 Hours
10° to 90°F.	24 Hours
30° to 60°F.	7 Days
40° to 100°F.	24 Hours
40° to 100°F.	24 Hours
50° to 130°F.	24 Hours
60° to 90°F.	8 Hours
60° to 90°F.	24 Hours
70° to 130°F.	24 Hours
−25° to + 10°C.	24 Hours
5° to 40°C.	24 Hours

Use TEMPSCRIBE Recorders

BULB-TYPE (illustrated)—*For recording temperatures at a distance*
BI-METAL TYPE—*For recording temperatures in surrounding air*

- Portable—easily carried. Can be set on flat surface or hung on wall.
- Spring-wound instrument-type clock: 3 standard movements—8 hours, 24 hours or 7 days.
- Instrument measures 4½" x 5½" x 7½"; uses 4¼" diameter charts.
- Chart graduations easy-to-read; spaced uniformly over full range.
- Pen and its actuating components are in door. Doors are completely interchangeable to convert to any temperature range, or from bi-metal type to bulb-type.

Also available: (1) Interchangeable door with electro-magnetic armature to record running time of motors, burners, solenoid valves, etc. (2) Two-pen doors for recording temperature and electrical operation on same chart.

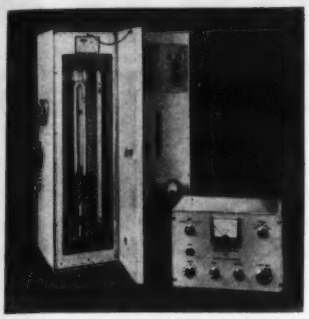
Write for Leaflets 786 and 872

BACHARACH INDUSTRIAL INSTRUMENT CO.
200 N. BRADDOCK AVE. • PITTSBURGH 8, PA. T-25

Check 3883 opposite last page.

umns and thermo-conductivity detectors. It should bring analysis by gas chromatography into fields untouched by existing instrumentation.

Description: Two types of detectors are available with unit, a flame ionization detector, and a Beta-Ray ionization



Column and detector complement existing packed column and thermal detector chromatography systems

detector. No reference cell is required with either component. Both may be programmed for changes in temperature during a run.

Beta-Ray detector has detectability in range of 10^{-14} moles of sample in carrier gas, flame detector is somewhat better. Electrical response time for both is one millisecond. Golay column provides resolution of up to 150,000 theoretical plates with a 150′ column.

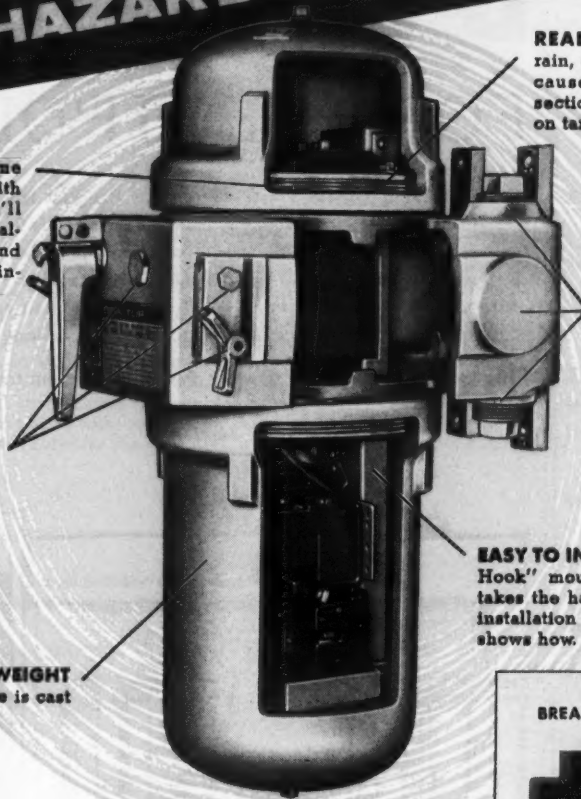
(Golay column-ionization detector system is supplied by Perkin-Elmer Corp., Norwalk, Connecticut.)

Check 3884 opposite last page.

"That's the heavy water line from the lab, stupid. . ."

Square D announces...

NEW SPIN TOP® ENCLOSURE FOR HAZARDOUS LOCATIONS



REAL PROTECTION against rain, dust, dirt and weather because male threads on collar section engage female threads on tank.

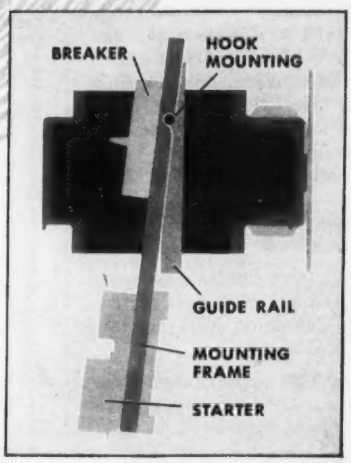
DAMAGE-RESISTING Acme thread. If you've struggled with "banged-up" threads, you'll appreciate this feature. It's always a breeze to put on and take off tanks for installation, inspection or maintenance.

INCREASED WIRING SPACE and through-feed conduit entrances for horizontal tap-offs.

EASY TO ADD pushbuttons or selector switches with easy-to-buy, easy-to-use "off-the-shelf" parts kits.

EASY TO INSTALL • "Slide and Hook" mounting arrangement takes the hard work out of the installation job. Diagram below shows how.

STRONG and LIGHTWEIGHT The complete enclosure is cast aluminum.



SLIDE and HOOK MOUNTING

4 SIZES FOR STARTERS SIZE 0 THROUGH 5

CLASS I, GROUP C and D • CLASS II, GROUP E, F, and G

The new **SPIN TOP** enclosure is available from your Square D Distributor in three ways—complete device, enclosure only, or components only...for reversing and non-reversing across-the-line starters and combination starters. And for combination and non-combination two-speed starters.

Write FOR BULLETIN 9990

Square D Company, 4041 North Richards St., Milwaukee 12, Wis.

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

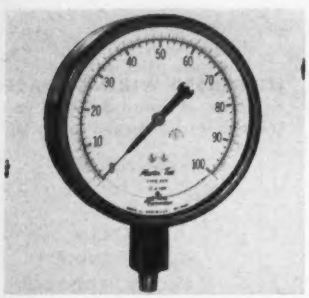
Check 3885 opposite last page.

Pressure gages accurate to plus or minus 0.25% of maximum dial reading

Uses: Pressure and/or vacuum indication.

Features: Series of gages are individually dead-weight tested and guaranteed accurate within ±¼ of 1% of maximum dial reading over entire range.

Description: Master-test pressure gages are equipped with dials to permit readings to be taken with accuracy of



Non-parallax dial on pressure gage permits correct reading even if read at an angle

a caliper rule. Three types are used: twin-tip pointer ensures accurate dead-on reading; mirror dial permits observer to obtain perfect alignment in reading; non-parallax dial has Plexiglas insert which optically raises graduations giving a correct reading even if dial is read at an angle.

Designs are all available in dial sizes of 4½, 6, and 8".

(Master-test pressure gages are products of Marsh Instrument Company, 3501 Howard St., Skokie, Ill.)

Check 3886 opposite last page.

Develop liquid pressures up to 50,000 psig with air-powered pumps

Uses: Pumping liquids, including oil, water, and various chemical solutions. Capacities range from 1 to 40 gal/hr.

Features: Air-powered pumps develop liquid pressures up to 50,000 psig at temperatures up to 500°F. Pumps

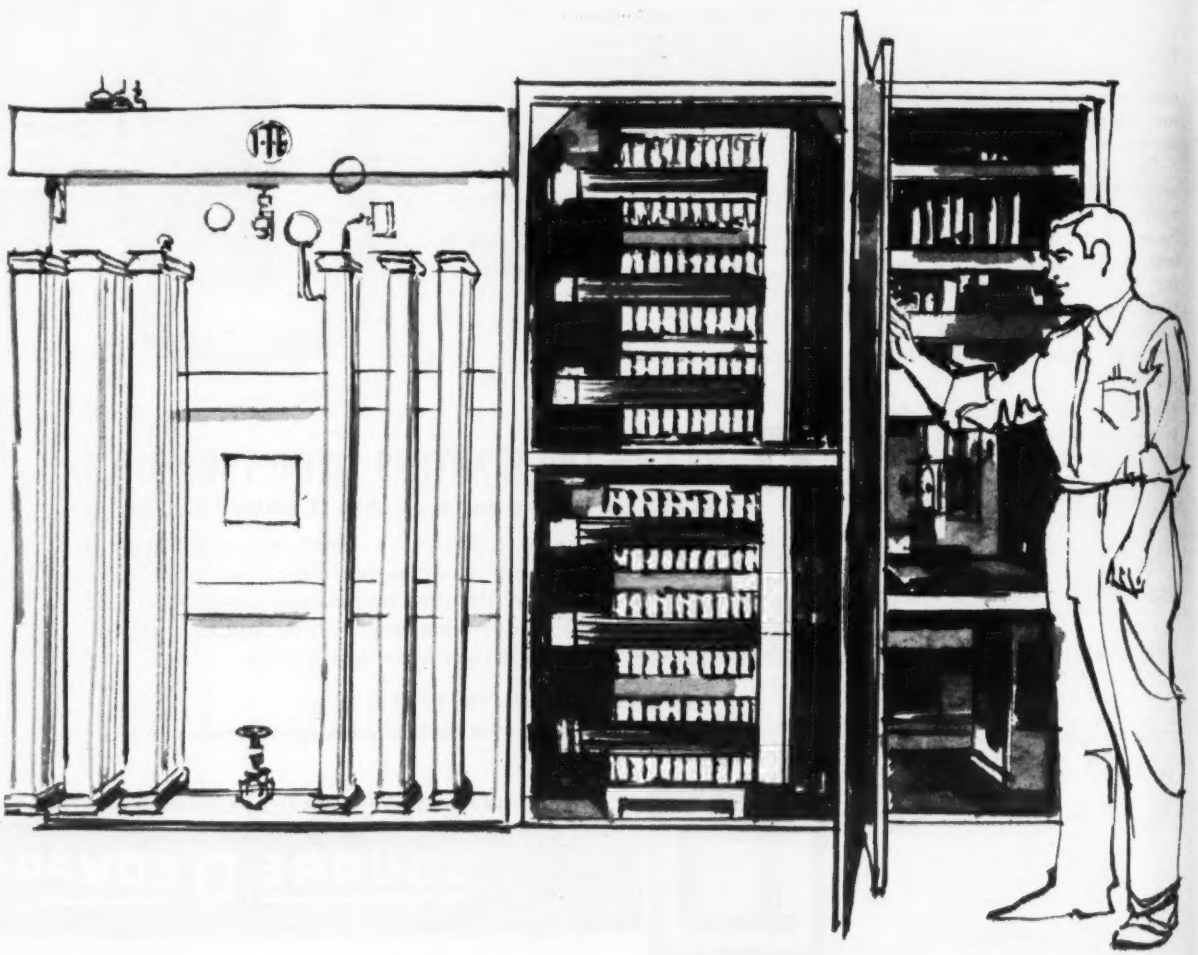
D-C POWER PACKAGE

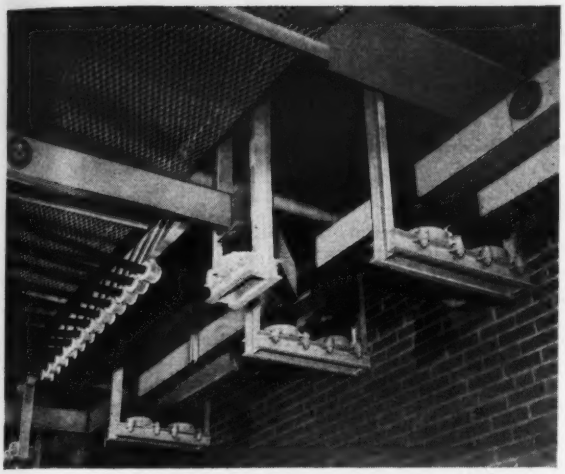
FOR ELECTROLYTIC PROCESSES

Only the I-T-E UNITRON Semi-Conductor Rectifier lets you select cells at random. Instead of having to code cells for use in various positions, you can use any cell in any position. This is because the unique I-T-E voltage divider and current balancing circuits maintain equal inverse voltage and equal current on all cells. So they have greater assurance of long life.

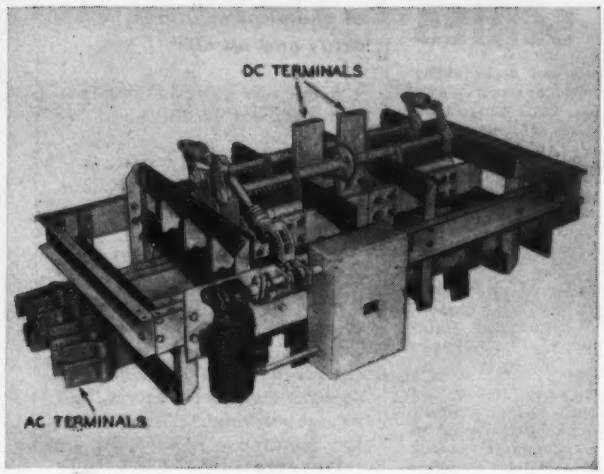
The UNITRON saves you money in the cooling system too. It uses a closed circuit water cooling system which continuously purifies and deionizes the water. This cooling method eliminates the need for power-eating blowers and space-eating ducts. It saves the cost of special coolants. And it's so effective it significantly prolongs cell life.

The I-T-E UNITRON can be built in any desired d-c voltage and current rating required for your application.





CONDUCTION. I-T-E prefabricated bus comes to you completely engineered down to the last detail . . . including connectors, fittings and bus supports. Number, size and configuration of conductors are carefully specified to insure desired conductivity, high strength, adequate thermal capacity, and low losses. Parts are formed, punched and marked to permit fast, accurate field assembly. All joints are high pressure, with silver-to-silver contact.



CONTROL. Type CR electrolytic cell and bus switches pack enormous capacity into a much smaller space than conventional knife switches. Individual units are furnished in two sizes, 3000 and 6000 amp, and are rated at up to 250 volts. They may be easily paralleled for any desired current capacity. Switch is designed so that contacts may be replaced without dismounting. Long life and dependability proved in service for many years.

PROTECTION. Type FB anode circuit breakers from I-T-E limit arcback current to 60,000 amp or less on large mercury arc rectifier systems. Novel arrangement of 6-pole breaker permits removal of single pole without interrupting service. You can replace a breaker in 3 minutes. Each pole is complete in itself. FB breakers can be equipped with reclosing controls for completely automatic protection of unattended stations.

CI-3

I-T-E Circuit Breaker Company
1900 Hamilton St., Philadelphia 30, Pa.

- ☐ UNITRON rectifier
- ☐ Type FB circuit breakers
- ☐ Prefabricated bus
- ☐ Type CR switches
- ☐ Primary unit substations
- ☐ K-LINE LV switchgear (600 v)
- ☐ Other.....

Name.....Title.....

Company.....

Street.....

City.....Zone.....State.....

SEND COUPON

Get complete, up-to-date information on I-T-E equipment

I-T-E CIRCUIT BREAKER COMPANY

Check 3887 opposite last page.

are ideal for locations where electrical power is not available or where such power is dangerous to use.

Description: Pumps are of duplex design. An automatic air transfer valve reverses flow of air pressure from one side of drive piston to the other, thus maintaining a continuous pumping action as long as air pressure supply is maintained. Teflon, Kel-F, or metallic foil packing is available.

(Aminco air-powered pumps are product of American Instrument Co., Inc., 8030 Georgia Ave., Silver Spring, Maryland.)

Check 3888 opposite last page.

No servos are needed with these digital transducers

Uses: Measuring process variables and providing digital encoding for flow, liquid level, pressure or temperature.

Features: Transducers employ completely mechanical force amplifier, actuated directly by standard measuring elements, to position shaft of precision encoder. This eliminates need for electronic servos, vacuum tubes, magnetic amplifiers or electronic components. Initial cost and maintenance are reduced, reliability is increased.

Description: Series 400 transducers are available in vacuum and pressure ranges to 10,000 psi, temperature ranges to 600°F, and in mercury or bellows type manometers for liquid level or flow applications. Units are conservatively rated with an accuracy of ±1.0% of span. Reproducibility is better than ±0.5% of span.

Linear or square-root encoders are available. Transducers are housed in standard all-weather meter cases.

(Series 400 American digital transducers is a product of American Meter Company, Inc., Mechanical Components Dept., PO Box 309, Garland, Texas.)

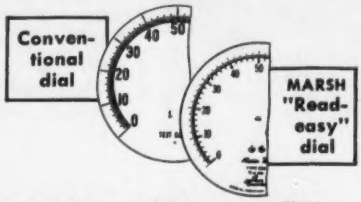
Check 3889 opposite last page.

New MARSH "Master-Test" SERIES

Twin-tip pointer enables observer to read "dead-on" by lining up twin tips like gun sight.

Unprecedented accuracy and dependability in test gauges developed to meet today's exacting requirements. Each gauge individually *dead-weight tested!* Guaranteed accurate within ¼ of 1% plus or minus of maximum dial reading over entire range.

Mirror dial also insures accurate "dead-on" reading.



New "Read-easy" dial (patent pending), as illustrated above, assures reading accuracy in keeping with indicating accuracy. Also note three advanced means of reading available in all "Master-test" gauges: twin-tip pointer, mirror dial, and "non-parallax" dial as shown opposite.

Sizes 4½", 6", 8". All standard pressure ranges 0-15 psi to 0-30,000 psi, vacuum and compound.

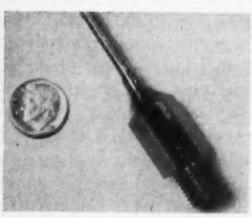
"Non-parallax" dial has Plexiglas insert that assures accurate reading even when read at angle.

Ask for new 20 page bulletin covering all details

MARSH INSTRUMENT CO., Dept. Z, Skokie, Ill.
Division of Colorado Oil and Gas Corporation
Marsh Instrument & Valve Co., (Canada) Ltd.
8407 103rd St., Edmonton, Alberta, Canada
Houston Branch Plant, 1121 Rothwell St.,
Sect. 15, Houston, Texas

Check 3890 opposite last page.

Miniature **FAST-RESPONDING**
Surface **THERMOCOUPLE**



New Design Features Offer for the First Time a Thermocouple with:

- **A Response Time of Less than 10 Microseconds**
- **A Maximum Continuous Service Temperature of Over 2000°F.**
- **An Operating Pressure Range to 50,000 psi**
- **A Sensing Tip with unlimited Life**

Revolutionary design uses thin ribbon thermocouple wires and mica insulation of .0002 inches thickness. Will operate under extremely high velocity and high pressure conditions.

Available in iron-constantan, chromel-alumel, or platinum-platinum/10% rhodium standard thermocouple elements.

For additional details and models write for Bulletin No. TB 159.

NANMAC CORPORATION
P. O. Box 8, Indian Head, Md.

Check 3891 opposite last page.

INSTRUMENTATION

For precise proportioning of chemical solutions, acids and alkalis

Pump has corrosion-resistant transparent plastic head

Uses: Accurately and uniformly proportioning solutions for processing operations or water treatment.

Features: Proportioning pump provides precise controlled feeding of chemical solutions, acids, and alkalis. Corrosion-resistant transparent plastic head, Hypalon diaphragm and check valves, and straight-through flow design are featured.

Description: Electrically driven, positive-displacement chemical proportioning pump has discharge pressures up to 125 psi. Unit is available in three models, Simplex, Duplex and Triplex, for adjustable, wide-range proportioning up to 12, 24, and 36 gph. Complete package ready for installation includes pump, suction and discharge tubing, injection nozzle, foot valve, tools and spare parts.

(Model 1210 Chem-O-Feeder pump is a product of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R.I.)

Check 3892 opposite last page.

Low oxygen levels found by analyzer unaffected by H_2 concentration

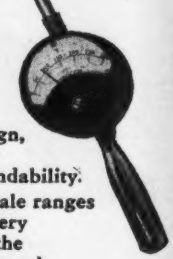
Unit suited for measurement of O_2 in inert gas

Uses: Analyzer was specifically developed for measurement of low concentrations of oxygen. Three models cover ranges: 0 to 1%; 0 to 2%; and 0 to 3%.

Features: Analyzer is not affected by H_2 concentrations up to 50% and is sensitive to changes as low as 0.01% oxygen. Accuracy is ±2% of range. Hydrogen insensitivity makes unit particularly well suited for O_2 measurement in inert gas atmospheres.

Description: Analyzer provides a continuous record of oxygen content by measuring variations of the paramagnetic

READ any surface temperature with Alnor® PYROCON



Equipment...material...metallic or non-metallic...flat, curved... revolving or stationary—you can read every surface temperature accurately in less than 3 seconds!

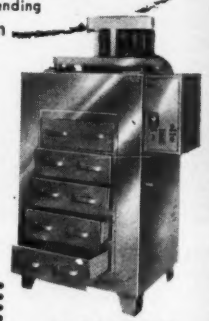
Compact, complete in precision design, this rugged instrument assures highest standards of speed, accuracy and dependability.

Alnor Portable Pyrocons come in scale ranges to 2000° F., with thermocouples for every application. You'll find full details on the Pyrocon exactly suited to your operations in Bulletin 4257. Send for your copy now. Write: Illinois Testing Laboratories, Inc., Room 804, 420 N. LaSalle St., Chicago 10, Ill.

Alnor **PRECISION INSTRUMENTS FOR EVERY INDUSTRY**

Check 3893 opposite last page.

Increase Production and Reduce Costs
with a Blue M Mechanical Convection
DRAWER OVEN
featuring POWER-O-MATIC® Patents Pending Control System



Range: 100° F. to 600° F.
Actual Control Point ± 1° F.

No need for special holding fixtures when processing steel, electronic parts, rubber or plastic. Five convenient drawers facilitate loading. Exclusive POWER-O-MATIC Control System provides closer, more uniform temperatures throughout every drawer. **One Blue M Drawer Oven replaces several individual inefficient units.**

• Fully Proportional Wattage Control • Completely Automatic • Horizontal Airflow • Heavy Duty Motor • Velocity Control • ETERNA Heater Bank • Heavy Steel Housing • Fiberglas Insulation • 5 Drawers • Ready to Operate

Model **POM-5D**
As described; drawer sizes 18½" x 5" x 20"; 5 K.W. max.
230V./1 Ph./60C. A.C. **$825.00**
230V./3 Ph./60C. A.C. **865.00**

BULLETIN NO. CP-73 AVAILABLE UPON REQUEST

BLUE M *Electric Company* BLUE ISLAND, ILL.
MANUFACTURERS AND DESIGNERS
COMPLETE TEMPERATURE CONTROL EQUIPMENT

Check 3894 opposite last page.

properties of sample gas. When coupled with recorder and suitable sampling system, it provides fast response (time constant: 4 to 7 sec) to fluctuations in oxygen content.

Analyzing cell consists of a doughnut-shaped gas passage with glass cross member. Two-section magnetic-field generating coil is wound on cross member. Oxygen-bearing gas is drawn into magnetic field, heated, thus cooling first winding. Cooler, more magnetic gas is drawn in, forcing previously warmed gas to pass second winding, thus warming it. Temperature difference is interpreted as percent oxygen.

(Model 632 low range oxygen analyzer is product of The Hays Corporation, Michigan City, Indiana.)

Check 3895 opposite last page.

Mechanical positioner remotely controlled

Uses: Positioning and/or rotating test probes or other similar devices by remote control.

Features: Actuator is purely mechanical eliminating need for electrical components in immediate area. Unit is ideal for use in locations where high temperature, vibration, moisture, or other unfavorable conditions make electrical components undesirable.

Description: Actuator is capable of holding up to ¼" probes and can provide up to 100 lb thrust on traverse. Position is controlled and indicated remotely to an accuracy of 0.001" and rotation to 0.1°. Maximum movement is 12" and rotation is 360°.

Positioning unit is actuated by two mechanical cables operated by motor box approximately 10' away. Motor box, in turn, is controlled through an electrical cable from a control box located 100' or more away.

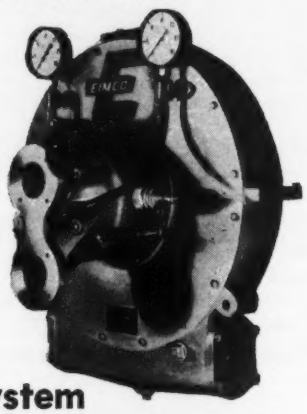
(Remote control positioning unit is a product of United Sensor & Control Corp., PO Box 127, Glastonbury, Conn.)

Check 3896 opposite last page.

These Twin Features Give You Better Drum Filter Performance . . .

1 HY-FLOW Valve

. . . eliminates vacuum loss

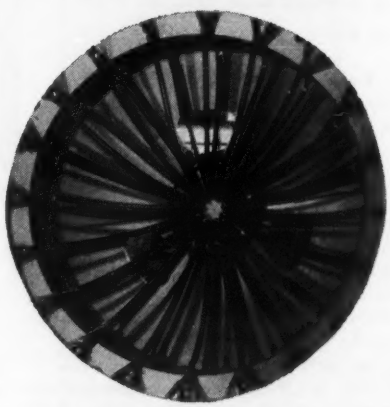


Filtrate flow is always unrestricted with Hy-Flow filter valve, developed by Eimco. This new, streamlined valve entirely eliminates all angular passages which caused troublesome turbulence and vacuum loss on flat type filter valves.

With Hy-Flow valve, drum filters operate more efficiently throughout all zones of the filtration cycle. Operators report greatly improved operating economies.

2 E-VAC System

. . . eliminates moisture in piping



Another major improvement in drum filter design, perfected by Eimco, is the E-Vac system of sweeping moisture from piping with air.

Vacuum to lead and trail pipes from each drum compartment is alternately blocked off as drum revolves. Air drawn through pipes sweeps moisture from piping system and drainage deck. No blow-back of filtrate. Result is a dryer filter cake.

The Eimco representative in your area can give you more facts on Eimco's complete line of filtration or process equipment for liquid-solids separation.

THE EIMCO CORPORATION • SALT LAKE CITY, UTAH

Research and Development Division, Palatine, Illinois • Process Engineers, Inc. Division, San Mateo, California

Export Offices Eimco Building, 51 - 52 South Street, New York 5, N. Y.

BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD B - 423

Check 3897 opposite last page.

King MANOMETERS

For Plant and Laboratory

King Manometers are rugged, low-cost instruments of unexcelled accuracy for measuring pressure, vacuum, differential pressure, and pressure-related phenomena. They're available in the following types, in a complete range of sizes:

U-Type Manometers

- Single Cleanout
- Double Cleanout
- With 3-Valve Manifold
- Inverted U-Type

Well-Type Manometers

- Low-Well
- Raised-Well
- Adjustable-Well
- Barometric-Reading
- Flowmeter Type
- Inclined-Tube

Multi-Tube Manometers

- Individual-Well
- Common-Well
- Photo-Manometers

NEW CATALOG 2008 gives details on these and other models — includes manometer liquids and accessories — explains basic principles. Write —

I/C INSTRUMENTS

KING ENGINEERING CORP.

Box 270 • Ann Arbor, Mich.

REPRESENTATIVES IN PRINCIPAL CITIES

Check 3898 opposite last page.

ELECTRONICS-TIME

Lumenite

AUTOMATIC CONTROLS

- ELECTRONIC LIQUID LEVEL
- INDUSTRIAL TIMERS
- TIME SWITCHES
- MAGNETIC SWITCHES
- ELECTRONIC SWITCHES

For Complete Information and Prices on Equipment Needed Write For Any Bulletin Listed Below.

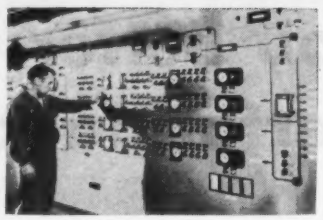
LT—Time Switches	FL—Liquid Level	ITC—Ice Thickness
PC—Program Clocks	FM—Milk Level	BH—Boiler Level
CR—Cycle Repeaters	FN—Nonconductive Liquid	MV—Motorized Sanitary Valves
R—Time Delay Relay	RMC—Automatic Reset	IT—Interval Timers
LAS—Auto-Lawn Sprinklers	LEE—Photo-electronic Relays-Counters, Etc.	

LUMENITE ELECTRONIC CO.

ENGINEERS • DESIGNERS • MANUFACTURERS

407 South Dearborn Street Chicago 5, Illinois

Check 3899 opposite last page.



High-quality cellophane in continuous production

Extensive instrumentation makes possible continuous production of high-quality cellophane at American Viscose Corporation's, Marcus Hook, Pa., 50-million-lb/yr film plant. Pneumatic transmission, combined with electronic and radioisotope selection of concentration, gravity, and chemical composition are employed. Miniature indicating and controlling instruments permit operator to make any adjustments necessary without leaving his station. In more than 95% of the instances instruments make necessary corrections without any manual control.

(Instrument system was designed and installed by Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.)

Check 3900 opposite last page.

Senses liquid presence or change from liquid to gas

Uses: Sensor can be used on tanks to sense liquid levels for rate of filling or percent of capacity.

Features: Electronic unit senses presence of liquids or any change from liquid to gas, or vice versa. It will operate efficiently in many diversified fluids, such as liquefied gases, hydrocarbon fuels, red fuming nitric acid, fluorides, hydrazine, and water. It can withstand extreme environmental conditions of violet vaporization of liquid gases, high rates of flow, shock, vibration, and temperature.

Description: Sensor is basically a light switch with a light source, optical prism, solar cell, miniaturized transistor amplifier, and relay. Am-

TANK-O-METER

FOR MEASURING TANK CONTENTS ANY DISTANCE AWAY

TANKS MAY BE...

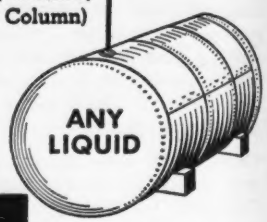
- BURIED OR ELEVATED
- OPEN • CLOSED • VENTED
- UNDER PRESSURE • UNDER VACUUM
- UNDER PRESSURE AND VACUUM

ACCURATE • RELIABLE • DURABLE

Also gauges for:

Barometric Pressure (Mercury Column)
Absolute Pressure (Mercury Column)
Pressure and Vacuum
Differential Pressure
Inclined Manometers for draft, pressure or differential pressure.

SEND FOR BULLETINS

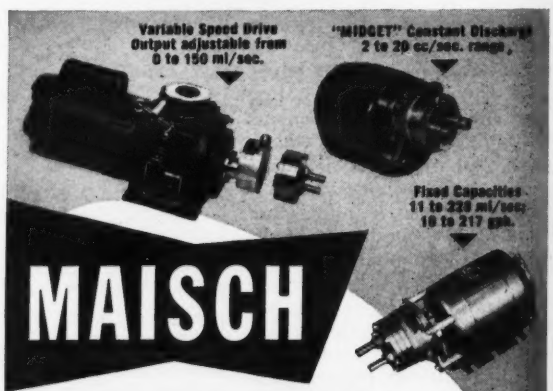


Uehling INSTRUMENT CO.

488 GETTY AVE.
PATERSON, N. J.

SINCE 1896

Check 3901 opposite last page.



MAISCH

METERING PUMPS

- STAINLESS STEEL — OILLESS BEARINGS — STERILIZABLE
- POSITIVE DISPLACEMENT — SMOOTH, NON-PULSATING FLOW
- FOR HOT, COLD, VISCOUS OR WATERY FLUIDS
- ACCURATE WITHIN 1 TO 2%

Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glue, processing solutions, etc. Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Write for complete details and prices.

MECHANICAL PRODUCTS CORPORATION

1722 West Hubbard Street • Chicago 22, Illinois

Check 3902 opposite last page.

plifier and relay can be separated from probe for specific applications.

Sensing element is a silicone solar cell. Light rays from bulb are directed down one side of prism and reflected internally from two 45° surfaces of prism to solar cell. When prism end of probe is immersed in liquid refraction of light is changed to permit rays to pass into liquid without internal reflection. When prism is in gas, rays are internally reflected. Unit will operate on 28 volts DC. It is initially being used on the Titan missile.

(Liquid-level electronic sensor is being produced by Pioneer-Central Division of Bendix Aviation Corporation, Hickory Grove Road, Davenport, Iowa.)

Check 3903 opposite last page.

Up to 60 samples/hr analyzed by unit for chromatographs

Handle full stream, fraction

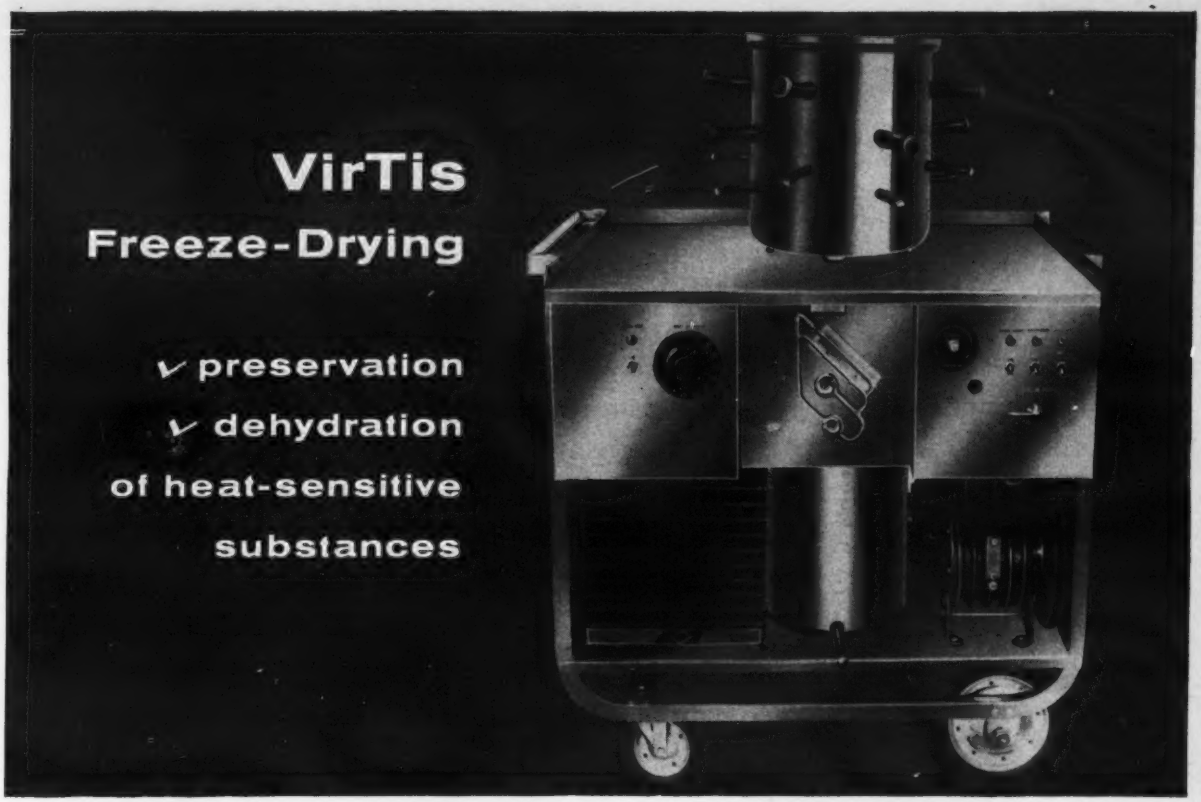
Uses: For continuous automatic analysis of chromatographic fractions.

Features: Operating as a separate analytic entity in chromatographic set-up, the analyzer can accurately handle either full-stream delivery of column effluent, or any part thereof. Combined outputs of any number of columns and fraction collectors can be continuously analyzed at a rate of up to 60 samples /hr.

Description: Modular design of AutoAnalyzer permits full flexibility of arrangements. Basic system includes proportioning pump, mixing coil, heating bath, colorimeter, and recorder. Programming mechanism is available to accurately effect the correctly timed sequence of a series of changes. Self-cleansing system is applicable to such diverse materials as amino acids, proteins, peptides, polypeptides, steroids, polyphosphates.

(AutoAnalyzer is a product of Technicon Chromatography Corp., Chauncey, N.Y.)

Check 3904 opposite last page.



Mechanically Refrigerated Freeze-Mobile

Why freeze-drying?

Samples are frozen solid then subjected to high vacuum. When heat is applied under these conditions, moisture is gradually removed by sublimation, resulting in a dry, porous sample which can be reconstituted by adding water. Sample can be preserved indefinitely when sealed under vacuum or inert gas.

There is a VirTis Unit for every need, ranging from a micro unit with 600-ml capacity to the mechanical system shown here. Write to S/P for complete details and the new VirTis catalog.

Compact, portable freeze-drying in your own laboratory!

APPLICATIONS:

- **Biological Research**—safe dehydration of hormones, vitamins, enzymes, bacteria and virus.
- **Organic Research**—purification of low vapor pressure solvents.
- **Pharmaceutical**—product preservation and dehydration.
- **Food Industry**—preservation of flavor and quality.
- **Hospital**—preserving bones, arteries, skin, etc.

This is a *complete* self-contained, all purpose unit with infrared heaters, condenser, vacuum drum, pump and gauge, and mechanically refrigerated unit. Automatically refrigerated as low as—60°C. Uniformly controlled radiant heating for fastest drying. A variety of flasks are available for manifold drying.

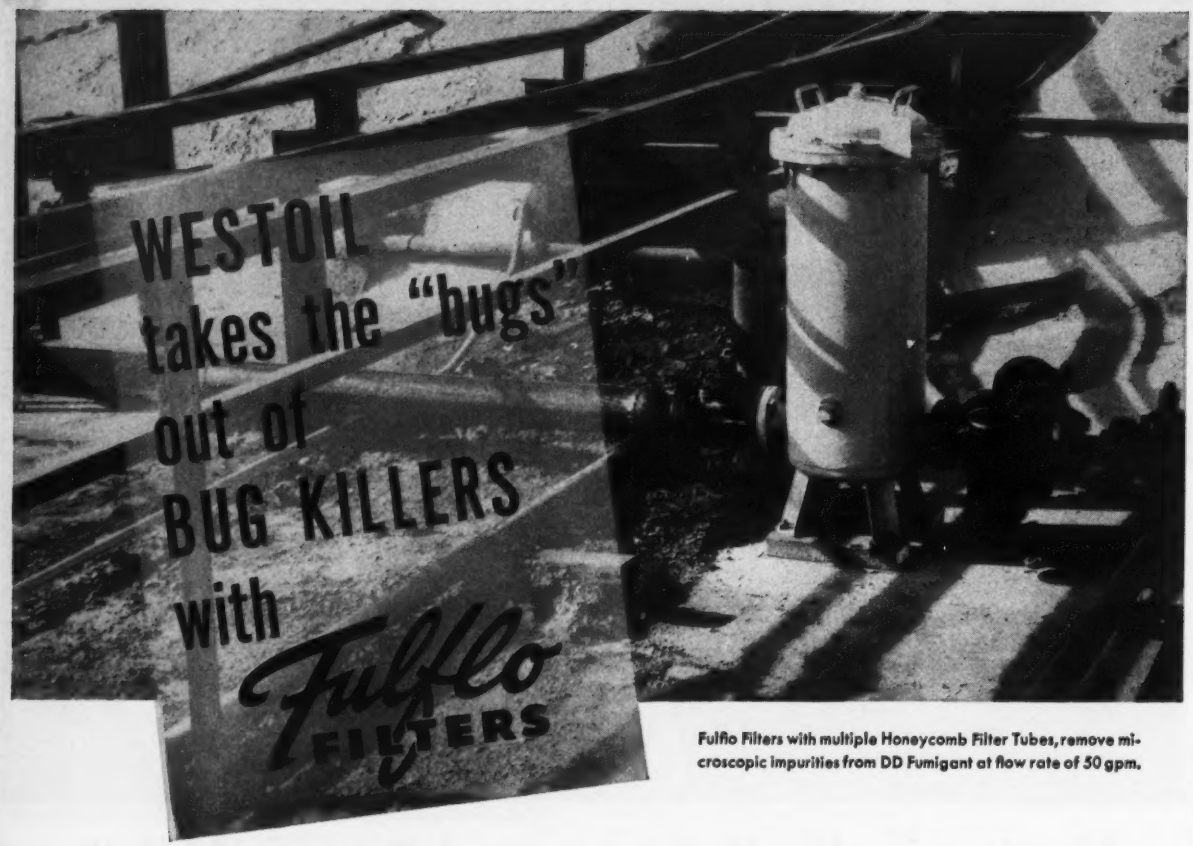
No. 69126—VirTis Mechanically Refrigerated Freeze-Mobile **$2,575.00**

S/P

Scientific Products

DIVISION OF AMERICAN HOSPITAL SUPPLY CORPORATION
GENERAL OFFICES—1210 LEON PLACE, EVANSTON, ILLINOIS
Regional Offices: Atlanta • Chicago • Columbus • Dallas • Kansas City • Los Angeles
Minneapolis • New York • San Francisco • Washington

Check 3905 opposite last page.



Fulflo Filters with multiple Honeycomb Filter Tubes, remove microscopic impurities from DD Fumigant at flow rate of 50 gpm.

Westoil Terminals Company ships deadly DD Fumigant to fight vicious tropical insects at South Pacific military installations. As the potent insecticide flows into drums, Fulflo Filters remove microscopic rust, dirt, and other impurities. This eliminates any danger of clogging or scoring the fine nozzles used in injecting the fumigant into the ground.

Fulflo Filters with genuine Honeycomb Filter Tubes, improve product quality, reduce downtime, prolong equipment life and increase production in a variety of operations. You get any desired degree of micro-clarity for all types of industrial fluids: liquid chemicals; pharmaceuticals; water; oils; liquid fuels; compressed air, CO_2 and other gases. They give true *depth* (not just surface) filtration, at minimum pressure drop, for high or low flow rate, pressure, *p*H, temperature and viscosity. Complete engineering facilities are at your service.

Write for catalog to Department CP

COMMERCIAL FILTERS CORPORATION
MELROSE 76, MASSACHUSETTS
PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

MICRO-CLARITY AT MINIMUM COST

Fulflo FILTERS — *with genuine Honeycomb Filter Tubes for controlled micro-clarity of industrial fluids.*

CFC FILTERS — *Selective filtration of oils • water-oil separators • magnetic separators • pre-coat filters • coolant clarifiers • automatic tubular conveyors.*

Check 3906 opposite last page.

INSTRUMENTATION

Cryogenic level control forte of controller for liquid levels

Uses: A sensing instrument for monitoring and measuring liquid levels, particularly for the critical field of cryogenic level control.

Features: Epoxy-encapsulated sensing module makes unit resistant to shock, moisture, and tampering. Control unit can be located at considerable distance from this probe.

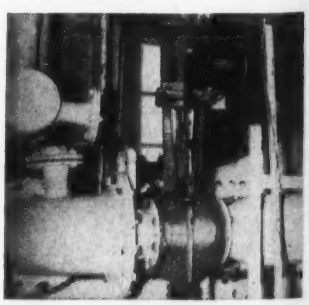
Description: Unit essentially measures variations in compacitance. Unit can be employed wherever liquid levels are susceptible to such measurement. Measuring module is mounted directly in head of probe for maximum efficiency. Probes can be furnished to accommodate various sizes and environmental requirements. They can be shielded, non-shielded, and flush, and are inert to most reagents.

(Liquid level sensor with Delta C module is a product of Trimount Instrument Company, 3119 W. Lake St., Chicago 12, Ill.)

Check 3907 opposite last page.

Accurate pulp stock flow obtained despite knots and wood slivers

Problem: Small consistency regulator chest left little room for error in metering pulp stock at Oregon Pulp and Paper Co., Portland, Oregon. Rate of flow of 4% stock is



Metering valve at Oregon Pulp and Paper Co. successfully controls flow of 4% pulp stock slurry containing knots and wood slivers

approximately 410 gpm. Stock contains knots, wood slivers.

Solution: A six-inch VeePort metering valve was installed between blow pits and regulator chest. Valve is operated by an air cylinder which in turn is controlled by a Foxboro positioner. Valve's diamond-shaped port permits linear flow characteristics. Stainless steel construction withstands corrosion.

Results: Despite addition of dilution water on downstream side of valve, unit maintains level in consistency regulator chest successfully. There is no plugging or failure to close because of knots or wood slivers.

(VeePort metering valves are product of Fabri-Valve Co. of America, PO Box 4352, Portland, Oregon.)

Check 3908 opposite last page.

Integrated control system requires no field power for operation

Pair of unshielded wires carry power and signal

Uses: Completely integrated system for electric process control.

Features: System features two-wire, DC transmission and requires no line power at field-mounted transmitters and transducers. A single pair of unshielded wires carry power as well as signal.

Description: Basic system includes a transmitter, receiver, controller, and final control element. Final control element can be: a current-to-pressure valve operator for operating diaphragm control valves or positioners; an electro-pneumatic valve positioner; or a self-contained electrohydraulic actuator.

By combining various transmitters, receivers, and controllers and transducers, virtually any process control operation can be performed.

(ElectriK Tel-O-Set system is supplied by Minneapolis-Honeywell Regulator Company, Pen and Bay Streets, Fall River, Mass.)

Check 3909 opposite last page.

POWER 3 SPEED COMPACTNESS

Fisher-Continental Type 480 will give you all 3 on your next Butterfly Valve Job

Consider a Butterfly Valve for your next control valve job. Compactness, ease of installation and low initial cost are definite plus features you can count on when using a butterfly valve.

Fisher-Continental eliminates the need for large massive power actuators with the introduction of the Series 480 P.O.P. pneumatically operated piston. You get the power, speed and compactness that's needed while still retaining the advantage of low initial and installation cost. Fisher-Continental Butterfly Valves with the 480 P.O.P. can handle high pressure drops of several hundreds of pounds depending on size of body and shaft.

It will pay you to find out how many ways Fisher-Continental Butterfly Valves can help you.

FISHER-CONTINENTAL TYPE 480

The versatile butterfly valve offers a number of other advantages such as being available in any size... any metal or alloy... suitable for any temperature... any fluid... any pressure ... any condition... and it is adaptable to any operator, manual or power.

IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD... CHANCES ARE IT'S CONTROLLED BY...

FISHER GOVERNOR COMPANY

Marshalltown, Iowa / Woodstock, Ontario / London, England

BUTTERFLY VALVE DIVISION: CONTINENTAL EQUIPMENT CO., CORAOPOLIS, PENNSYLVANIA

CONTINENTAL

FISHER® Controls

SINCE 1880

Check 3910 opposite last page.

Instrumentation Literature

Here is information on new bulletins containing valuable data on instrumentation and process control

Pressure transmitters suitable for sending proportional analog or digital signals to remote indicators, recorders, controllers, and data-handling equipment are detailed in four-page Bul 11-1221-2—Fischer & Porter Co., 216 Jacksonville Rd., Hatboro, Pa.

Check 3911 opposite last page.

Analog computer techniques and applications are the topics of four-page Donner Tech Notes, the first issue of which was recently released. Initial issue discusses "How to Simulate a Non-Linear Control System with an Analog Computer." Donner Tech Note 1—Donner Scientific Company, 888 Galindo Rd., Concord, Calif.

Check 3912 opposite last page.

Acceleration switches which have only one moving part are featured in four-page Inertia Switches Bul — Inertia Switch, Inc., 311 W. 43rd St., New York 36, N.Y.

Check 3913 opposite last page.

Multi-pointer indicators of miniature size are illustrated in four-page Product Spec 11-1 — Bailey Meter Company, 1050 Ivanhoe Road, Cleveland 10, Ohio.

Check 3914 opposite last page.

Flowmeters, flow switches, and manometers for liquids, gases, and combinations are summarized and illustrated in 40-page Flowmeter Cat—Seico Instrument Division, Eclipse Fuel Engineering Company, Rockford, Ill.

Check 3915 opposite last page.

Pressure cells, available in standard accuracies of ±¼%, are specified in Bul 4365 — Dept. 16-I, Electronics & Instrumentation Division, Baldwin • Lima • Hamilton, Waltham, Mass.

Check 3916 opposite last page.

Recording controllers and recorders are cataloged in 12-page Bul GEA-6887 — Instrument Department, General Electric Company, Schenectady 5, N. Y.

Check 3917 opposite last page.

Flowmeters are delineated in Meter Data Bul 566 EP — Neptune Meter Company, 19 W. 50th St., New York 20, N.Y.

Check 3918 opposite last page.

Electrometers, including linear, long, differential-current, dual-linear and dual-log types, receive full treatment in eight-page illustrated Form 3026-9 — The Victoreen Instrument Company, 5806 Hough Ave., Cleveland 3, Ohio.

Check 3919 opposite last page.

Sensing element designed for pulp-chlorination applications receives full treatment in comprehensive 12-page Diamond Chlorination Cell Brochure—Electro Chemicals Division, Diamond Alkali Company, 300 Union Commerce Bldg., Cleveland 14, Ohio.

Check 3920 opposite last page.

Heat-input control by pressure-drop method to obtain maximum capacity in fractionating column operation is covered in Data 282-14 — The Foxboro Company, Foxboro, Mass.

Check 3921 opposite last page.

Ultra-miniature indicator light for use in data-processing equipment, computers, and other applications, is illustrated, specified, and schematics given in eight-page Form L-160A—Dialight Corporation, 60 Stewart Ave., Brooklyn 37, N.Y.

Check 3922 opposite last page.

Meter-relays are shown and functions explained in four-page Bul S-1 — Assembly Products, Inc., Chesterland, Ohio.

Check 3923 opposite last page.

Digital computer with magazine-loaded photo tape reader is discussed along with programming systems; accessory punched card, magnetic tape, and paper tape equipment; and special-purpose devices in six-page illustrated Bendix Bul AB-059—Bendix Computer Division, Bendix Aviation Corporation, 5630 Arbor Vitae St., Los Angeles 45, Calif.

Check 3924 opposite last page.

Two-component blender, designed for blending accurately two liquids of similar properties, is described, uses cited, and illustrated in eight-page Bul SM-2070—Proportioneers Division, B-I-F Industries, Inc., 345 Harris Ave., Providence, Rhode Island.

Check 3925 opposite last page.

Formula capsule, the size of king-size cigaret pack, which plugs into socket on front of panel or may be inserted to remote-control station, is discussed in Tech Bul 59-3—Richardson Scale Company, Clifton, N.J.

Check 3926 opposite last page.

Demodulation techniques for linear variable differential transformers, based on a study of behavior of DC output in synchronous, or phase-sensitive, demodulators, are detailed in eight-page LVDT Bul 59-14—Schaevitz Engineering, Pennsauken, N.J.

Check 3927 opposite last page.

Trace-gas analyzer, based on unique method of gas analysis employing continuous ionization from alpha source, is outlined in Bul 0714-3—Mine Safety Appliances Company, 201 N. Braddock Ave., Pittsburgh 8, Pa.

Check 3928 opposite last page.

Controllers and transmitters are delineated in six-page illustrated Condensed Cat 709—Controls Division, Black, Sivalls & Bryson, Inc., 15 N. Cincinnati St., Tulsa, Okla.

Check 3929 opposite last page.

Multiple tube, of copper, aluminum or polyethylene, for pneumatic and hydraulic instruments and control, is featured in Bul 458-E — Crescent Insulated Wire & Cable Co., Trenton 5, N.J.

Check 3930 opposite last page.

Electronic measuring and data-handling systems are covered in Bul G-101—Gilmore Industries, Inc., 13015 Woodland Ave., Cleveland 20, Ohio.

Check 3931 opposite last page.

Radiation gage for measuring and controlling fluid and slurry density in 3" pipes is detailed in two-page Bul ASR-3—The Ohmart Corporation, 2236 Bogen St., Cincinnati 22, Ohio.

Check 3932 opposite last page.

Digital computers for industrial data processing and on-stream computation are covered in Tech Bul 103—Daystrom Systems, division of Daystrom, Inc., 5640 La Jolla Blvd., La Jolla, Calif.

Check 3933 opposite last page.

Moisture monitors for use with high-pressure gases, gaseous mixtures, and vapors are reviewed in two-page Bul 1855 — Analytical & Control Instrument Division, Consolidated Electrodynamics Corp., 360 Sierra Madre Villa, Pasadena, Calif.

Check 3934 opposite last page.

Signaling controller is described in illustrated 4-page Bul IS 51—Thermo Electric Co., Inc., Saddle Brook, N. J.

Check 3935 opposite last page.

Colorimeters for laboratory section use are illustrated, and applications and features specified, in four-page brochure. Color-Eye Bul—Instrument Development Laboratories, Inc., subsidiary of Royal McBee Corporation, 67 Mechanic St., Attleboro, Mass.

Check 3936 opposite last page.

Pressure gages of all types and tank-level meters are covered in Pressure Gage Buls and Tank Meter Literature — Uehling Instrument Co., 488 Getty Ave., Paterson, N.J.

Check 3937 opposite last page.

Flowmeters for measuring and controlling fluids at low rates, and which are suitable for panel or direct pipeline mounting, are described in Bul 18P — Instrument Division, Schutte and Koerting Company, Cornwells Heights, Bucks County, Pa.

Check 3938 opposite last page.

Electronic computer which is transistorized is introduced along with details of speed, capacities, and over-all performance, in Honeywell 800 Bul—Datamatic Division, Minneapolis-Honeywell Regulator Co., 151 Needham St., Newton Highlands, Mass.

Check 3939 opposite last page.

Flowmeters, ranging from small purge meters to laboratory rotameters and calibrators, are cataloged in Flowmeter Bul—The Matheson Company, Inc., PO Box 85, East Rutherford, N.J.

Check 3940 opposite last page.

Control equipment, valves, and their applications in paper-making processes are summarized along with diagrams of several major processes in 16-page Tech Bul MD-1—Dept. D-8, Conoflow Corporation, 2100 Arch St., Philadelphia 3, Pa.

Check 3941 opposite last page.

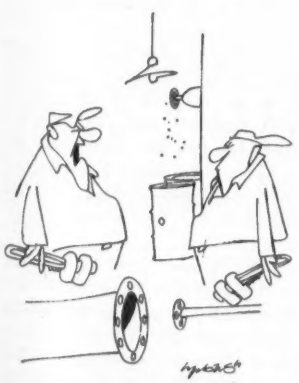
Infrared spectrophotometer is described along with specifications and handling data in Bul 739 — Beckman/Scientific and Process Instruments Div. of Beckman Instruments, Inc., 2500 Fullerton Road, Fullerton, Calif.

Check 3942 opposite last page.

Frequency meters are itemized in six-page, two-color Bul 200 — Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn 1, N. Y.

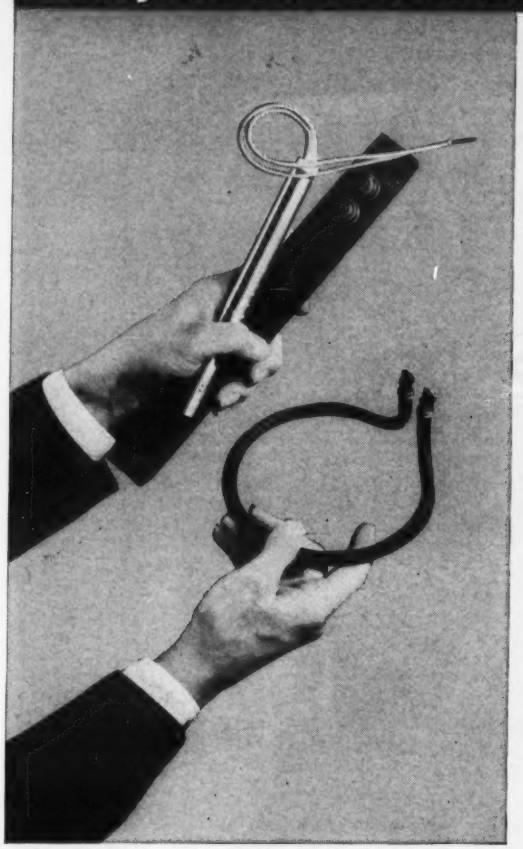
Check 3943 opposite last page.

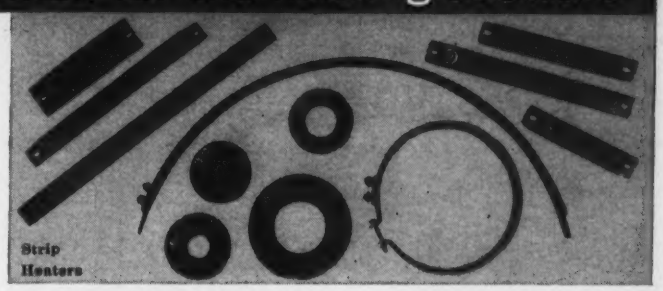
Technical reports catalog listing all reports in field of computers currently available from the federal government may be obtained by writing the Office of Technical Services, Publications and Public Information Division, U.S. Department of Commerce, Washington 25, D. C., and requesting CTR-371 Computers, 1937-58.

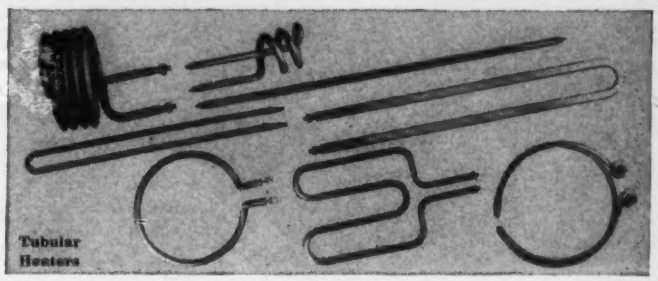


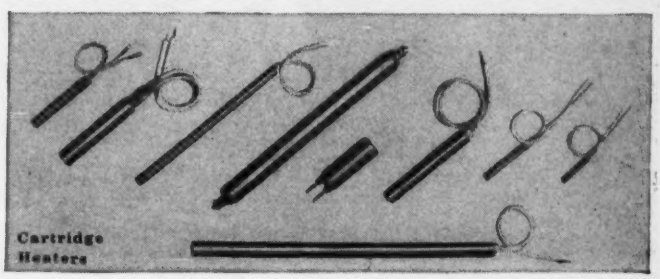
"Think big, Smith. . ."

Call your CHROMALOX Man for the heating answers









These 3 basic CHROMALOX heaters provide answers to just about any heating problem

Strip Heaters . . . that quickly and easily bolt or clamp to platens, dies, kettles, tanks, pipes, rolls, drums, ovens and air ducts. Lengths from 4 to 96 inches, widths from ¾ to 2½ inches, with cross section curving or lengthwise bending. Available with brazed-on fins.

Tubular Heaters . . . that clamp on, fit into machined grooves, cast into metals, immerse in liquids, install in ovens and ducts. Straight lengths or factory-formed to nearly any contour. Lengths from 6 inches to 30 feet. Triangular or round cross section. Available with brazed-on fins.

Cartridge Heaters . . . that smoothly fit standard drilled holes in dies, platens, molds, extrusion and injection barrels. Special leads available for protection against flexing action, abrasion, moisture or vapors. Diameters from ⅜ to 1¹⁹⁄₆₄ inches, lengths from 1⅛ to 25⅜ inches.

Versatile Chromalox electric heaters are available in sheath materials and wattages to match almost any application to 1100°F. Easy to install, they are fast, clean, safe and economical.

Your Chromalox Man can help you determine the one that best answers your specific problem. He's backed by the world's largest factory stock of industrial heaters, ready for immediate shipment. Why not give him a call. You'll find his phone number listed at the right.

Our new Catalog 60 provides detailed product information and suggests numerous applications for the complete line of Chromalox electric heaters for industry. If you have not yet received a copy, please let us know. 1601

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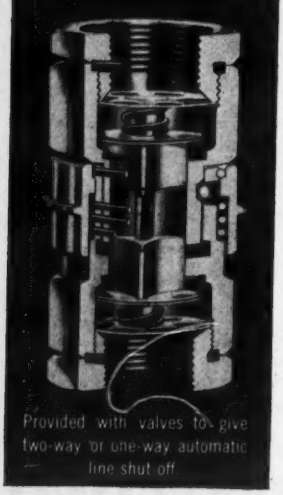


Built to handle high pressure hydraulic and pneumatic systems

Snap-Tite *valved* couplings stop flow instantly"

Snap-Tite provides instant shut-off wherever fluid coupling is needed.

Snap-Tite *valved* couplings connect and disconnect quickly and fully—they automatically open line flow when connected; positively seal your line when disconnected—with no "ifs," no chance for human error.

Snap-Tite couplings are available in sizes from ¼" to 6" ID, in steel, brass, aluminum, 303 ss and 316 ss. Sizes from 6" to 10" ID are available on special order. For more information, write for Snap-Tite catalog #58. Snap-Tite representatives are located in all principal cities.

SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS

Snap-Tite

ST-59-01 SNAP-TITE, INC. • UNION CITY 6, PA.

Check 3945 opposite last page.

Analog computer designed for optimization studies easily expanded

Uses: Computer is designed to perform optimization studies for petroleum, chemical, and other processing industries. It also provides an advanced mathematical tool to aid operations research.

Features: Equipped with 202 operational amplifiers, 60 electronic multipliers, and 20 ten-segment diode function generators as basic computing elements, facility is readily expandable to more than twice this size. It may be expanded in the field on a "building block" basis without rewiring or mechanical modification.

Description: Unit is scheduled to be installed at Humble Oil & Refining Company's Texas refinery latter part of 1959. Precision repetitive operation at 50 solutions per second will permit processing engineers to vary equation coefficients and observe resultant effects continuously on a 17" oscilloscope. Unit has fully transistorized data selection circuits, wideband electronic multipliers.

(MC-5900 analog computer is product of Computer Systems Inc., 611 Broadway, New York 12, N. Y.)

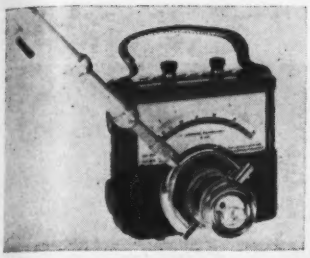
Check 3946 opposite last page.

Low error readings of temperature made with pyrometer

Uses: Measuring surface temperatures on metal, refractory, or painted surfaces including plastics and textiles.

Features: Surface Pyrometer reads directly temperature of practically all industrial surfaces except bright metals to an accuracy of ±¾%. Unit does not require good thermal contact or an electrically conductive surface.

Description: Unit is basically a radiation pyrometer but does not require emissivity corrections on most applications. Measuring range of the head is 200-2400°F. Face of measuring head can be placed



Pyrometer reads surface temperatures directly. No time is needed to calculate, correct, or manually adjust instrument

against or near surface, and temperature read directly on indicating instrument. Operator can stand at a distance as much as nine feet away from surface being measured.

(Type SP Surface Pyrometer is supplied by Atlantic Pyrometers, Inc., 190 Warburton Ave., Hawthorne, N. J.)

Check 3947 opposite last page.

Infinitely adjustable positive displacement metering pump

Uses: Pump is ideal for slug feeding of precise quantities of slurries, adhesives, pastes, greases, and other viscous liquids and semi-liquids.

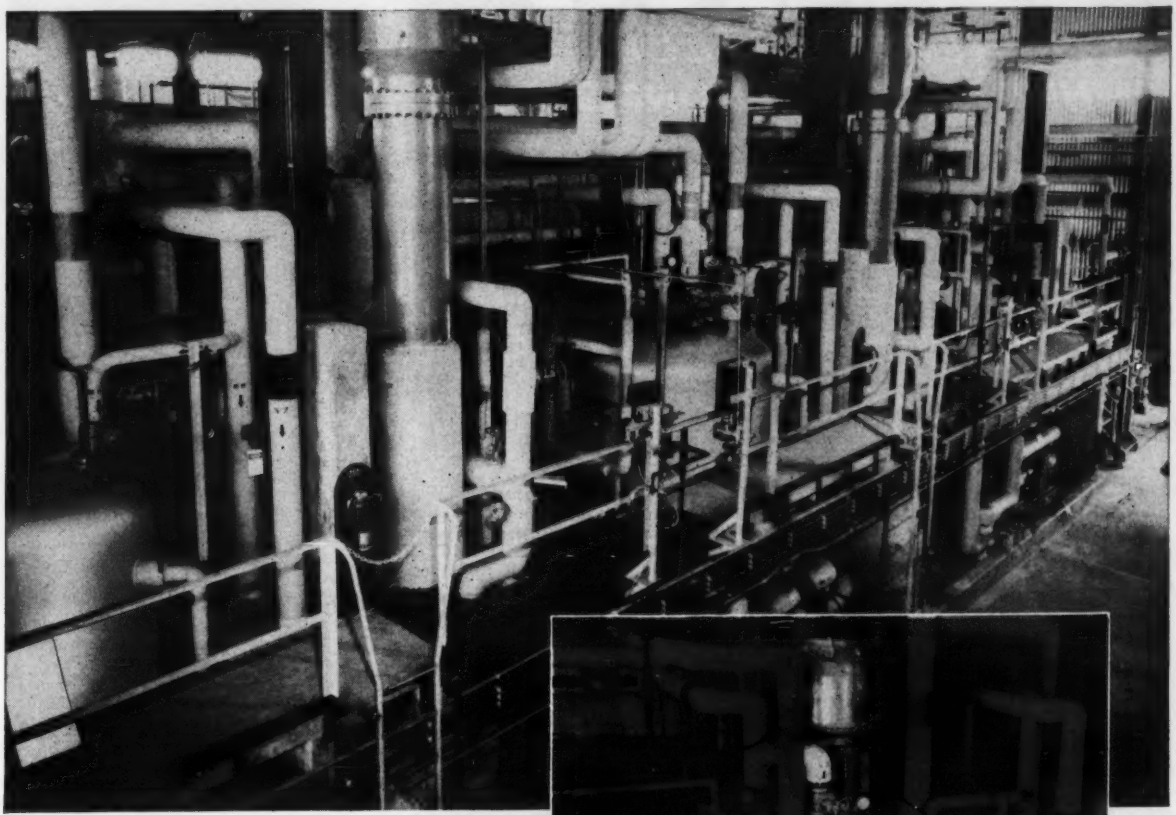
Features: Positive-displacement pump is infinitely adjustable within its capacity range of 0 to 6.44 cc. It provides precision metering of even heavy-bodied liquids.

Description: Pumping pressure can be as much as 354 psi. It is determined by air pressure (up to 200 psi) and air cylinder bore. Unit consists of a solenoid-actuated pneumatic cylinder and pumping head. Head contains inlet and outlet ports and provision for precise limitation of length of stroke of air cylinder piston. Air ports are ¼"; cylinder stroke is 0 to 2"; fluid line connections are ¼". Materials of construction can be varied to suit pumping requirements.

(Airmatic VC 1000-1 positive displacement pump is product of Airmatic Valve, Inc., 7313 Associate Ave., Cleveland 9, Ohio.)

Check 3948 opposite last page.

FIRST LARGE-SCALE HIGH-ENERGY LIQUID FUEL PLANT USES COWLES DISSOLVERS



(Above) Portion of $38,000,000 plant being operated by Callery Chemical Company for the Navy, showing typical Cowles Dissolver installations.

(Right) One of six giant Cowles Dissolvers installed by Callery Chemical Company in new Muskogee, Oklahoma, HiCal® plant.

Because Cowles Dissolvers provided the best pattern of dispersing materials and compounds to fine particle size in the shortest possible time, Callery Chemical Company selected six of the largest Cowles Dissolver models for this great new plant. Basic in efficiently processing the highly critical materials involved is the patented Cowles Impeller with its unique power transmission system.

Close cooperation between engineers of Callery, The Ralph M. Parsons Company and Morehouse-Cowles, led from a two-stage operation to a single-step method combining the dispersion and reaction stages.

If your product requires ultimate dispersion, dissolving, emulsifying or deagglomeration, a Cowles Dissolver will do it better, faster, in less space, at less cost.

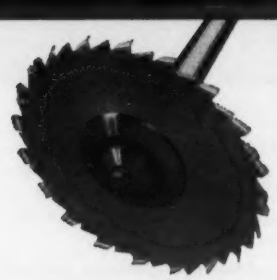
Let us prove it in your plant at our risk . . .

Write us today about your problem. Our applications engineers are at your service to help you solve it!

MOREHOUSE COWLES 8922

MOREHOUSE-COWLES, INC.
1150 San Fernando Road, Los Angeles 65, Calif.

IT'S THE TEETH THAT MAKE THE **BIG** DIFFERENCE!



Representatives in principal cities
Convenient lease and time-payment plans.

Check 3949 opposite last page.

Allflex

STAINLESS STEEL

"MNH" FLEXIBLE CONNECTORS

A NEW stock answer to pipeline problems caused by rigid connections.

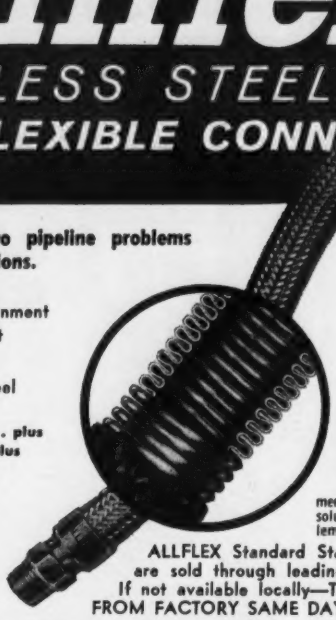
- Dampens Vibration
- Compensates for Misalignment
- Permits Offset Movement
- Absorbs Expansion

With ALLFLEX Stainless Steel Connectors you get:

- **CORROSION RESISTANCE . . plus**
- **PRESSURE RESISTANCE . . plus**
- **HEAT RESISTANCE . . plus**
- **FLEXIBILITY**

Also available in Monel, Bronze and Steel.

WRITE TODAY for fact-filled ALLFLEX Bulletin



THESE STOCK SIZES
¼" ⅜" ½" ¾"
1" 1¼" 1½" 2"

IN THESE STOCK LENGTHS
12" 18" 24" 30"
36" 48" 60"

SHIPPED FROM FACTORY SAME DAY ORDER IS RECEIVED.

Also available in all standard sizes thru 16", in any required lengths, and with any special or standard end fitting or flange connections. Send your problems to Allied's Engineering Department. Let us suggest the best solution for your flexation problems.

ALLFLEX Standard Stainless Steel Connectors are sold through leading Industrial Distributors. If not available locally—THEY CAN BE SHIPPED FROM FACTORY SAME DAY ORDER IS RECEIVED.

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NOW! VIKING PUMPS

in a complete line of

ALLOYS

Stainless Steel
Monel
Steel Nickel
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Ni-Resist
White Bronze
and many others

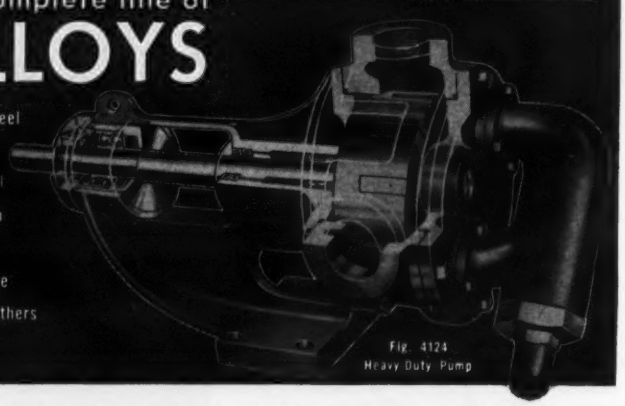

Fig. 4124
Heavy Duty Pump

Have problems of handling liquids and semi-solids of a corrosive nature, or where contamination is not permitted? Viking Rotary Pumps made of alloys to fit the need, will answer those pumping problems.

Available in a capacity range from ¼ to 300 G.P.M. and larger. New induction melting foundry facilities mean rigid control and faster delivery of the complete line of Viking alloy pumps.

Send your pumping problem to Viking today and ask for Alloy Pump catalog MCC.

VIKING — The Leader not a follower in Rotary Pumps

VIKING PUMP COMPANY

Cedar Falls, Iowa, U.S.A. In Canada, it's "ROTO-KING" pumps
See Our Unit in Chemical Engineering Catalog

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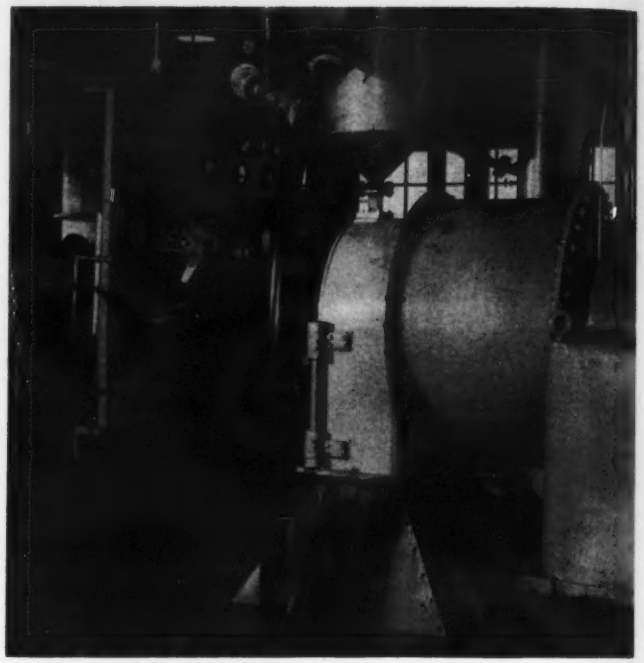


Lines handling 20% salt slurry and wet chlorine gas at Syracuse plant of Solvay Process Div., Allied Chemical Corp., were virtually a continuous maintenance burden. Corrosion and erosion now have been checked as . . .

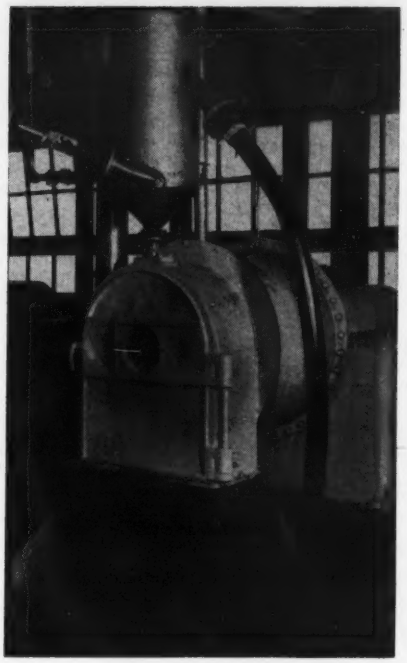
Problem: Metallic piping handling overflow from 20%-salt-slurry feed tanks had a service life of only slightly more than a year because of corrosion and erosion. Salt slurry, at a temperature of 131°F, is used for electrolytic chlorine production at Solvay Process Div., Allied Chemical Corp., Syracuse, N. Y.

In addition, movement of slurry through metal piping was somewhat retarded at joints and couplings. This caused slurry to settle out and plug up. Considerable downtime was required to clean out lines and maintain proper flow.

In the chlorine plant itself, vitreous tile handling wet chlorine gas at a temperature of 158°F required weekly packing to prevent air leakage which would dilute the chlorine and result in poor gas test and production loss. About two days' time was required each week for this operation.

Solution: Two lines of polyethylene pipe, 4" in diameter, were installed about 1½ years ago on salt-slurry feed tanks. Lines are 12' and 20' in length, and leave the tanks at an angle of 45°. More recently, 200' of 4" polyethylene pipe were installed to replace tile carrying wet chlorine gas.

Pipe is fabricated from high-molecular-weight linear polyethylene (molecular weight is 750,000). It is extruded by a special technique and has a working temperature up to 150°F under pressure, up to 212°F under atmospheric pressure. Pipe shows absence of stress cracking, resistance to cycling pressure loading, good



Polyethylene piping on brine feed tanks permits smooth, non-clogging flow of 20% salt slurry. Brine is fed to electrolytic chlorine cells at Syracuse, New York, plant of Solvay Process Div., Allied Chemical Corp.

Flexibility of polyethylene pipe eliminates many elbows and fittings. Installation has achieved more than double normal service life of metallic piping, with no indication of failure

Linear polyethylene pipe shines in salt slurry service

chemical and solvent resistance, no notch sensitivity, and good abrasion resistance.

Five- and seven-foot lengths of this polyethylene piping, 2" in diameter, were also in-

Results of Comparison Tests On Plastic Pipe

Test	A*	B**	C**
Environmental stress cracking at 70°F, hours, in Igepal C0630	5200(a)	0.5	1.6
Environmental stress cracking at 120°F, hours, in Igepal C0630	2000(a)	0.3	1.5
Flexing fatigue at 70°F, cycles (260 cpm)	5,000,000(b)	6000	16,000
Pressure cycle testing, 100-300 psig, 80°F, cycles (2" pipe at 10 cpm)	91,980	240	10

* Pipe used at Solvay
** Other high-quality commercially available plastic pipe
(a) Test continuing — no failures to date
(b) Test discontinued — no damage appears likely

THIS...

PLUS THIS...

STOPS THIS!

"SCOTCHRAP" Pipe Protection Tape stops corrosion due to electrolysis and chemical or bacterial attack

"SCOTCHRAP" BRAND Pipe Protection Tape is tough polyvinyl chloride plastic in convenient roll form—quality controlled for uniform electrical properties which include excellent insulation resistance and high electric strength. It offers a quick, low-cost method for protecting pipes, conduits, and other metal surfaces against corrosion. Tight-holding pressure-sensitive adhesive sticks at a touch—no flame, heat, or messy pots needed. *Safe and easy to apply* for spot protection or a whole system—by anyone. "SCOTCHRAP" Tape resists acids, alkalies, and solvents. Available in seven standard widths from 1 inch to 18 inches; in thicknesses of 10 and 20 mils.

Write for free technical literature including application information. Address: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. EAO-99.

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SCOTCHRAP Pipe Protection Products

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...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Check 3952 opposite last page.

1

No scraping, cleaning, resurfacing or replacing flanges when installing new seal!—

The unique design of Gask-O-Seals will save hundreds of man hours, and eliminate the tedious work of reconditioning flanges.

2

Save downtime—

Gask-O-Seals will not wear due to **pulse** or **vibration**. They last longer and are quickly and easily changed. **Sure, positive** sealing extends seal life. Fool proof installation reduces replacement time and repair.

3

Eliminate extreme hazard of "blow-out"—

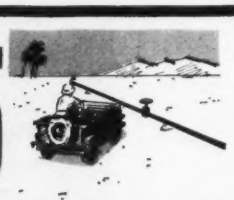
Since Gask-O-Seals are **totally** confined with metal-to-metal contact of faying surfaces, the danger of a seal "blowing out" is completely eliminated under normal working conditions. This feature alone can save your company millions of dollars.

4

No retorquing of bolts necessary—

Once a Gask-O-Seal is installed there is no need to re-torque bolts. The seal can not "creep" or "cold flow." There is no need for tightening bolts to maximum, causing distortion of flanges. ..... the flanges are easy to break loose at time of repair or overhaul.

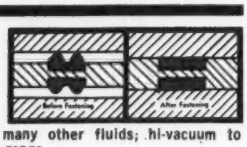
5



Re-useable—

Due to the carefully controlled mass-to-void ratio in the Gask-O-Seal design, the seal can not be over squeezed — its "memory" never destroyed by fastening pressures. They, therefore, may be reused several times with just ordinary care.

Plus — Due to low fastening torques required to effect a seal, flanges can be designed to greatly reduce mass and smaller bolts used, less bulky wrenches and tools are required and automatic equipment used for even faster installation. Gask-O-Seals will seal water, oil, air, hydraulic fluids, gases, gasoline and many other fluids; hi-vacuum to hi-pressure, in a very wide temperature range.



Try Gask-O-Seals and reduce your maintenance costs **now.**

Parker SEAL COMPANY

CULVER CITY, CALIFORNIA and CLEVELAND, OHIO

A DIVISION OF PARKER-HANNIFIN CORPORATION

Check 3953 opposite last page.

stalled on incoming and outgoing brine lines to chlorine cells. Non-metallic pipe previously evaluated had showed a tendency to warp and pull out of flange, or was attacked by the solution.

Results: Flexibility of piping eliminates joints and elbows and reduces vibration from equipment. Smooth path provided prevents clogging and markedly reduces friction and wear. In wet chlorine gas line, elimination of between 35 and 40 joints greatly reduces chance of leaks. Manhours previously expended to pack joints each week are no longer required.

Sections of pipe used on brine feed tanks have been in service two years and give no indication of failing. Although wet chlorine gas line has been in service for a considerably shorter time, indications are that in addition to saving considerable maintenance time it will also show increased service life.

It is now anticipated that all brine lines on chlorine cells will eventually be of this material.

(A-C polyethylene pipe is available from Orangeburg Manufacturing Co., Inc., 488 Madison Ave., New York 22, N. Y.; Carlon Products, Aurora, Ohio; Yardley Plastics, Columbus, Ohio.)

Check 3954 opposite last page.

(For more information on high-density polyethylene used for pipe, contact Semet-Solvay Petrochemical Div., Allied Chemical Corp., 40 Rector St., New York 6, N.Y.)

Check 3955 opposite last page.

Teflon lining of hose extends over flanges; avoids contamination

Uses: For loading and unloading operations or emergency piping systems involving acids and industrial chemicals.

Features: Fluids cannot contact or be contaminated by metal-flanged fittings or outer covering.

Description: Transfer hose

consists of abrasion-resistant rubber jacket reinforced with spiraled high-tensile wire, and internal layer of Teflon that extends through hose and over face of flange.

Due to non-adhesive surface, fluid flow is rapid with little or no buildup of corrosive solids reported. Hose is easily cleaned by flushing. Available in 1½, 2, and 3" diameters.

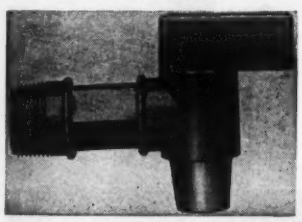
(Fluoroflex-T transfer hose is manufactured by Resistoflex Corporation, Roseland, N.J.)

Check 3956 opposite last page.

Dribble trouble eliminated with polyethylene faucet

Uses: May be used on all ¾" standard drum openings.

Features: Instant full flow is obtained by ¼ turn of handle. Vertical ribs inside spout eliminate dribble. Lack of



Elimination of opening and closing threads in polyethylene faucet avoids possibility of leakage

opening and closing threads in faucet precludes leakage.

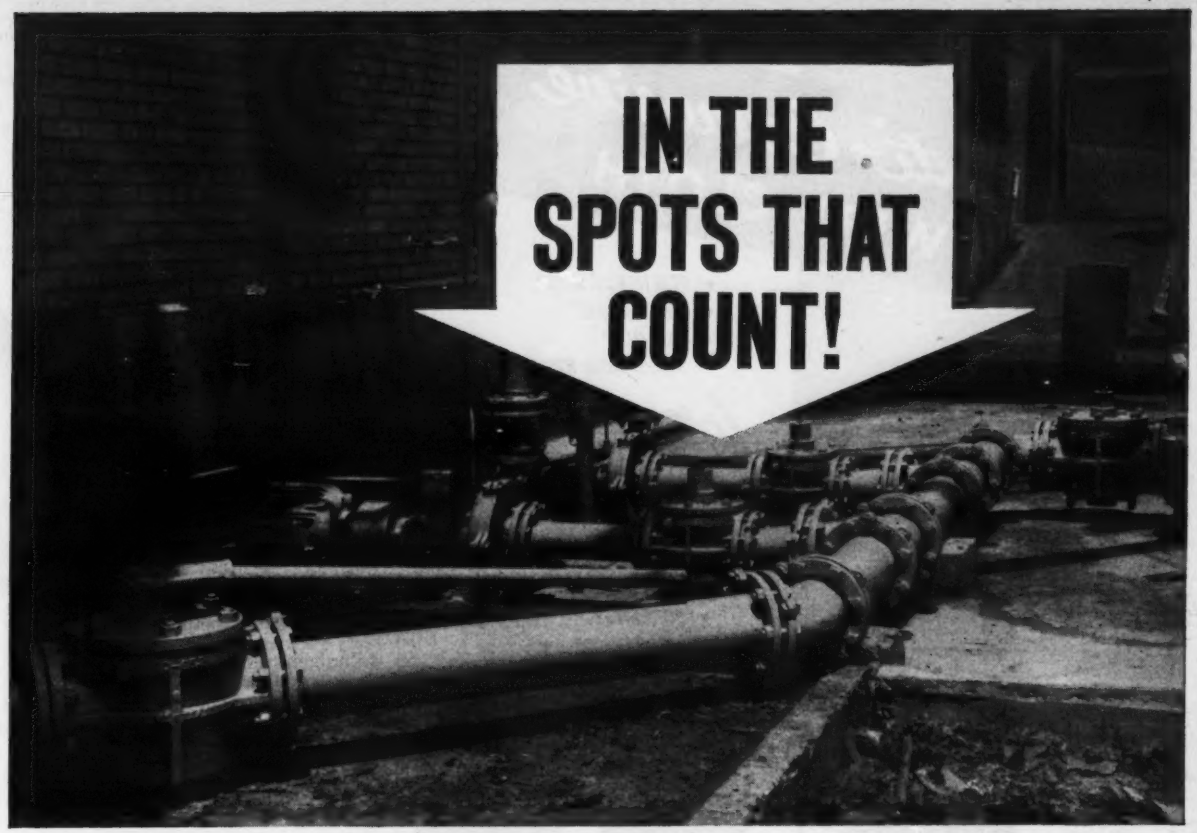
Description: Virgin polyethylene faucet is manufactured in metallic gold color. It is reported to give satisfactory service to 140°F. Inside diameters of barrel and spout are ⅝".

(Flo-Rite faucet is product of Multi-Meter Corporation, 1041 Custer Dr., Toledo 12, Ohio.)

Check 3957 opposite last page.

NEXT MONTH

Zinc-vinyl coating system that has required absolutely no maintenance in four years will be discussed in story coming up in October CP.



Goodyear specifies Homestead Valves for non-contamination of GR-S latex rubber

Homestead lubricated plug valves handling latex rubber.

Through the round ports of Homestead Lubricated Plug Valves at Goodyear Tire and Rubber Company's synthetic rubber plant in Houston, Texas, flow dilute solutions of GR-S latex rubber at 80 p.s.i. and 100° F.

Fluid solutions never lodge and build up in the line since Homestead Round Port Valves provide full circular opening through plug and body of the valve—same size as the pipe they serve.

Controlled pressurized lubrication plus extremely close tolerances between plug and body assure lubrication of all sealing surfaces without contamination of line fluids.

Write for complete details on low first cost, low maintenance, Homestead Valves in our catalog 39-1.

☐ Please send me catalog and prices on Homestead Lubricated Plug Valves. 140

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

hv

HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. Box 140, Coraopolis, Pennsylvania

Check 3958 opposite last page.

Are you using wire cloth or wire cloth parts which must be corrosion resistant? Are the service conditions in your plant really tough? If you have a problem selecting the proper anti-corrosive alloy, Newark Wire Cloth may have the answer.

Available in all corrosion resistant metals, Newark Wire Cloth is accurately woven in a wide range of meshes, ranging from very coarse to extremely fine.

If you have a wire cloth problem involving corrosion, please tell us about it . . . we may have the answer.

NEWARK for ACCURACY

If it's wire cloth or fabricated wire cloth parts, Newark is your best source of supply. Send for our latest literature.

Newark Wire Cloth COMPANY

351 VERONA AVENUE • NEWARK 4, NEW JERSEY

Check 3959 opposite last page.

CORROSION CONTROL

Impellers on gas pumps are protected against sparking, corrosion

Impellers on manufacturer's line of gas pumps are now available with nickel alloy coating which protects against sparking and corrosion. This makes them of value for applications in sewage treatment and chemical plants.

Coating is deposited by chemical method providing a hard, uniform, corrosion- and abrasion-resistant plating on impellers.

(Sutorbilt gas pumps are manufactured by Sutorbilt Corporation, 2966 E. Victoria St., Compton, Calif.)

Check 3960 opposite last page.

(Kanigen nickel-alloy coating process is development of Kanigen Division, General American Transportation Corporation, 135 S. LaSalle St., Chicago 90, Ill.)

Check 3961 opposite last page.

Four domestic woods suitable for tanks resist corrosion

Technical paper discusses properties of each

Characteristics which confer acid and decay resistance to wood are high cellulose content, high lignin content and low pentosan content. Four domestic woods, which have enough built-in resistance to corrosion in form of oils and resins to be suitable for tank use, are available at reasonable cost.

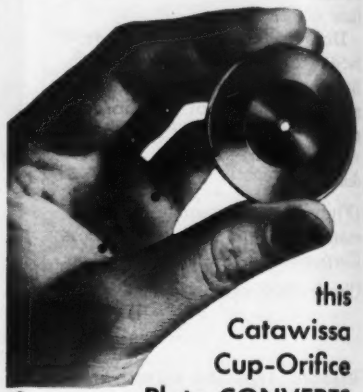
The woods are tidewater red cypress, long leaf yellow pine, California redwood, and yellow Douglas fir. The heartwood of these varieties is the part preferred for tank use.

Tidewater red cypress contains natural cypressenne oil which is highly resistant to almost all chemical fumes, liquids and gases. These trees grow in swamps. They are slow growing, with ring density and count being high. Accordingly, cell structure is strong and firm.

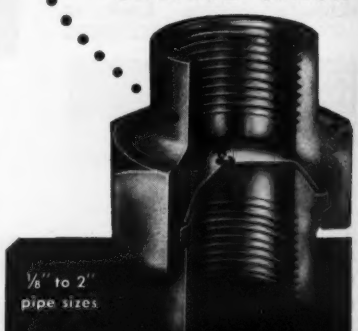
Cell structure and general

here's real **ECONOMY...**
time-saving **SIMPLICITY...**
and sure-fire **DEPENDABILITY**

for metering, measuring, controlling any piped material!



this Catawissa Cup-Orifice Plate CONVERTS any standard Catawissa Union into a *GASKETLESS* ORIFICE UNION



ELIMINATES the necessity of expensive gaskets...the uncertainty of what type gaskets are needed for specific temperature and pressure requirements... fumbling with extra parts!!!

Orifice Union problems of the past are gone forever! Stainless or carbon steel cup-orifice plate fits easily, quickly, securely to form a good, tight, leakproof seal. Temperature and pressure requirements are restricted only by the rating of the union itself (3000-lb. service, 9000-lb. test)!

Just specify "Catawissa Cup-Orifice Plates" or "Catawissa Cup-Orifice Unions" at your favorite supply store—or write for catalog and complete information.

CATAWISSA VALVE & FITTINGS CO.

CATAWISSA • PENNSYLVANIA

Check 3962 opposite last page.

growth of yellow pine is similar to cypress. Several differences in structure distinguish it, however.

Due to geographical considerations, lumber obtained is larger in size, longer in length, and of better quality. Ring growth is somewhat more rapid, for its cells are filled with terpene which is inherent decay resisting agent similar to cypressenne in cypress. In addition to terpene, yellow pine heartwood contains pinosylvin and pinotol. These are both strong preservatives.

Yellow pine of short-leaf variety is fast growing wood, with little, if any, of terpene so prevalent in long-leaf type. This is type of wood which is more readily creosoted and impregnated with various agents. Open-cell structure permits impregnant to enter and fill, completely changing basic characteristics of this lumber.

Creosote and some impregnants contain color impurities which render piece unfit for service where liquid must remain colorless and free from taste.

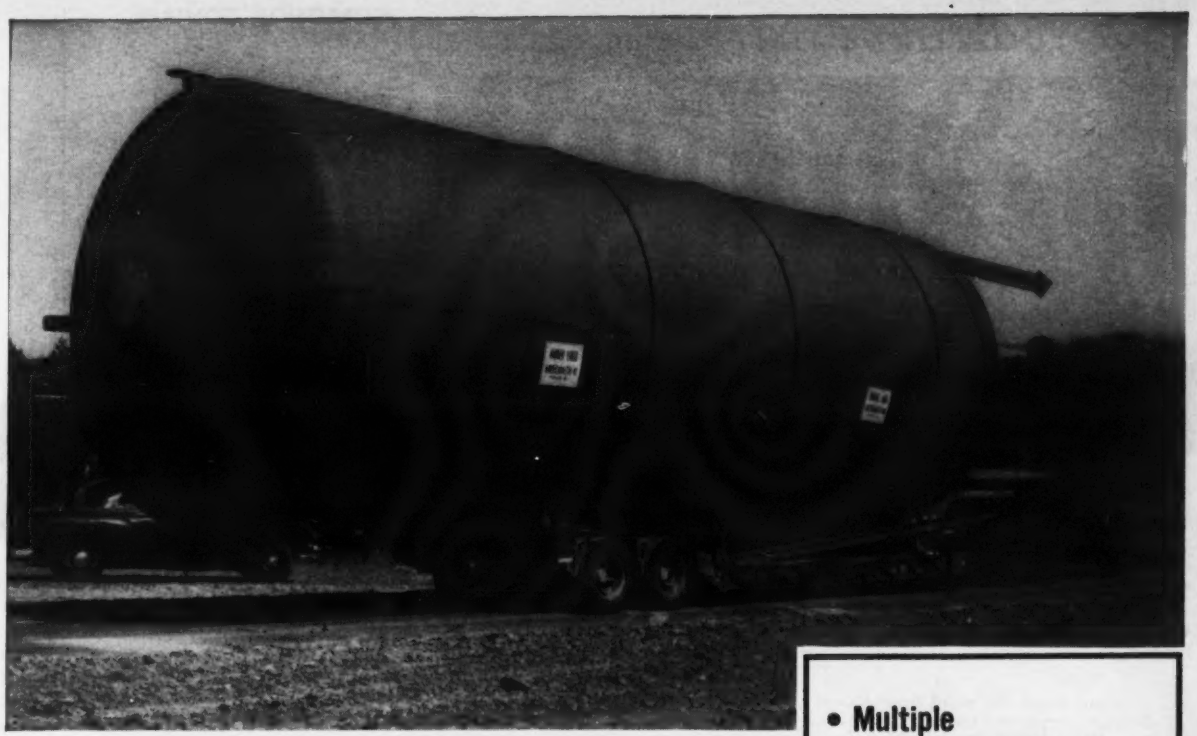
Woods Resist Decay

California redwood and yellow Douglas fir have similar characteristics in that their large logs produce close-grained thick clears of uniform dimension. Redwood has resins and tannins present in heartwood to resist decay. Douglas fir possesses toxifolin which is not only decay-resisting but also possesses fungicidal properties.

For certain applications (where gases and liquids of pickling acids are used) Douglas fir is given preference. This is due to its greater structural strength and to fact that it is more readily obtainable in larger timbers.

(Condensed from technical paper presented at the sectional meeting of the National Association of Corrosion Engineering in Buffalo, N.Y., by Arthur P. Pfeil, President, Arrow Tank Company, Inc., 16 Barnett St., Buffalo 15, New York.)

Check 4327 opposite last page.



MANHATTAN ACID-PROOF RUBBER LINING PROTECTS WORLD'S LARGEST VACUUM DEAERATOR

This deaerator is designed for removal of all minerals and silica from boiler make-up water at the nation's largest ion-exchange processing installation . . . and protected *permanently* against corrosion, contamination and abrasion with Manhattan Rubber Lining! Giant 52,000 gallon capacity is no problem for R/M lining specialists. If a unit can be shipped, it can be handled at a Raybestos-Manhattan rubber lining plant . . . equipment too large to ship is field lined and vulcanized by experienced and supervised crews.

The most modern facilities available today—*plus* experience dating back to the first tank lined in this country—are ready to assure the best possible lining job for your equipment at Raybestos-Manhattan. Manhattan Acid-Proof Rubber Linings are made from thick, multiple calendered sheets of natural or synthetic rubber for utmost protection and durability. Lining expands and contracts with metal under temperature change . . . won't harden or crack. Manhattan Rubber Lining is bonded to metal so securely tests have proved they can't be separated! Resistance to most acids and alkalis is as positive as advanced technology can provide. To make certain your equipment lining is flawless *and* permanent . . . every Raybestos-Manhattan Lined Tank is tested under high voltage.

Be sure your costly equipment and solutions get the *complete* protection your investment demands . . . discuss your lining requirements with an R/M representative nearest you.

- Multiple Calendered Sheets
- Permanent Protection Against Corrosion, Contamination
- Permanent Rubber-to-Metal Bond
- Resistant to Acids, Alkalis, Abrasion, Temperature
- Largest Facilities . . . Longest Experience
- Rubber Lining Plants at Passaic, N.J., North Charleston, S.C.

RH-904

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES

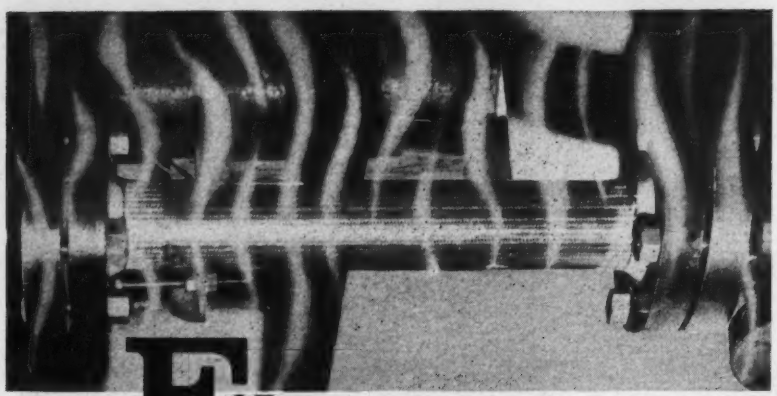
MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls

Check 3963 opposite last page.

No Maintenance Cost!



Fibercast®

PIPE and FITTINGS

—WILL NOT CORRODE!

You can throw the paint brushes away when you install Fibercast pipe and fittings... because Fibercast's exterior as well as interior is non-corrosive. This saves the need for routine—and costly—protective painting of the piping system.

Fibercast easily handles extremely hot, corrosive solutions – up to 300° F. with operating pressures to 1,000 p.s.i.

Proof of Fibercast superior performance is that Fibercast handles 320 out of 338 common corrosive solutions without deterioration.

Other Money-saving FIBERCAST ADVANTAGES:

- Smooth interior with a Hazen-Williams C Factor-147 assures against accumulation of residue, preventing contamination of the stream.
- Light weight — less than ¼ the weight of steel — and nominal 18' support spans contribute to easy installation.
- 3 Major systems of joining — standard flanged — cemented — threaded and coupled with complete line of fittings.

PRE-FABRICATING SERVICE, introduced by Fibercast 24 months ago, is proving to be the most practical method of piping system fabrication. Working from your prints, Fibercast engineers and piping specialists will design and fabricate the assemblies for simplified installation by plant personnel. This work is done on a firm quotation basis.

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SAND SPRINGS (TULSA), OKLAHOMA

FIBERCAST COMPANY, Box 727, Sand Springs, Okla., Dept. 899
Send your new Data and Information Bulletin No. 20; also other specific data for _____ application.

Name _____

Title _____

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City _____ State _____

Check 3964 opposite last page.

Brick lining is bonded by expanding mortar in chlorination tower

Vessel serves continuously for three years

Problem: A large Midwestern chemical company desired to construct a chlorination tower for operating conditions of 1250°F and 40 psi. Process vessel, approximately 7′ in diameter and 56′ in length was specified. Design was to incorporate conical top and bottom supported by skirt.

Solution: Prestressed, brick-lined process vessel was constructed. Vessel was made of ⅝″ A-285 Grade C carbon steel. It was lined with three layers of asbestos paper, two courses of 4½″ brick and one course of 2½″ brick, bonded with special mortar. Impervious interliner consists of two coats of resinous coating and layer of refractory tile, bonded with silicate mortar known as Asplit CN.

Mortar utilized for brick courses is type of silicate bonding material based on precisely adjusted potassium silicate. Material is essentially free from sodium silicate or other sodium compounds. It contains no fluoride setting agents.

Bonding material is compounded to withstand strong oxidizing acids and to resist sulfation and highly concentrated acids up to temperatures of 1900°F.

Results: Process vessel has been in continuous, trouble free operation for three years. Estimated life is 10 years or more. Total cost of brick-lined vessel installation was $63,296. Estimated cost of similar vessel, fabricated from an alloy which would have had life expectancy of one to two years, was $95,300. Cost of vessel, fabricated from alloy which would give service life comparable to brick-lined unit was estimated to be $115,000.

(Asplit CN mortar and Hoechst HFR-Z mortar are supplied by Pennsalt Chemicals Corporation, Natrona, Pennsylvania.)

Check 3965 opposite last page.

FILLED TEFLON* BEARINGS

Chempro Filled-Teflon Bearings are tougher, harder, more wear-resistant and less subject to thermal expansion with the addition of specific filter compounds to virgin Teflon. Ideal for pumps, mixers, reactors and similar equipment where a chemically inert, non-corrosive, non-contaminating and non-adhering bearing material is a must.

Chemical & Power Products offers a complete Filled-Teflon Bearing service, including Chempro Finished Bearings either Pressed in Housings or without Housings, or Chempro Filled-Teflon Molded Tubes for machining bearings in your shop. Complete machining instructions furnished.

CHEMPRO FILLED TEFLON STYLES

FM-2	Glass-Filled Teflon
FM-3	Carbon-Filled Teflon
FM-4	Glass and Carbon-Filled Teflon
FM-8	Graphite- and Zircon-Filled Teflon
FM-9	Molybdenum Disulfide and Glass-Filled Teflon
FM-10	Mica- and Glass-Filled Teflon

Write for Bulletin CP-558.

*duPont trademark

CHEMICAL & POWER PRODUCTS, Inc.
9 Broadway, New York 4, N. Y.

Check 3966 opposite last page.

THAT'S INTERESTING

Cheesy electronics

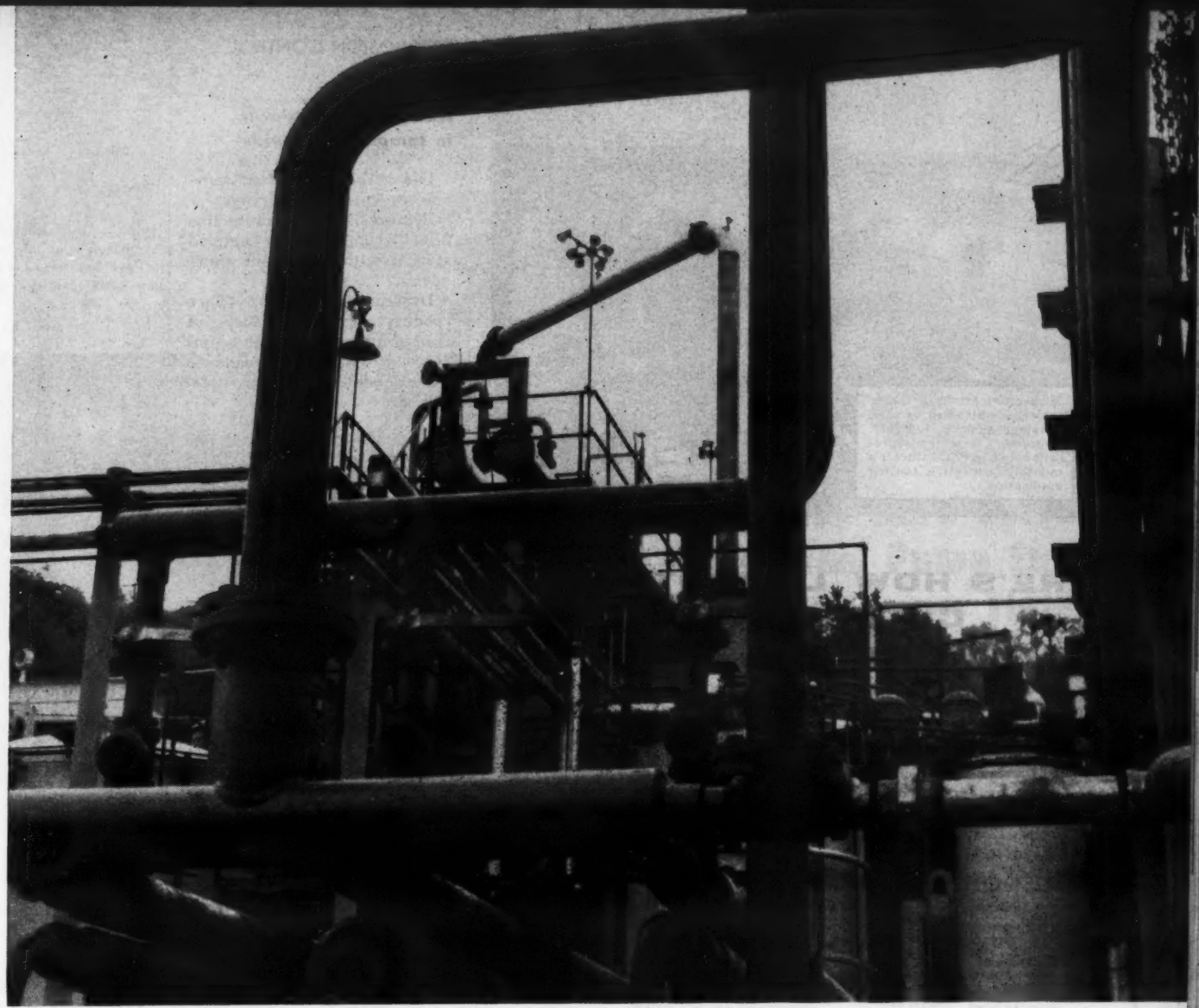
An electronic computer can be used to determine how cheese can be improved, Monsanto Chemical Company says after running a statistical study through its electronic "brain."

Opinions that one blend seems better, tastes better, or melts more readily can be assigned values on scales of individual judgment.

These judgments can be run through a computer, blended with other opinions, and machine will point out in which direction improvements can be expected.

Metal-core plastic screw

A new type composite plastic screw with a metal core has been patented by Austin Screw Products Co., Chicago. Screw has a serrated metal core with a threaded plastic body. Core carries the torque applied by driving means, eliminates danger of breaking or distorting the head.



"Stainless Steel reduces material and replacement costs"

reports Mr. William R. Boyles, Plant Manager, Stauffer Chemical Company, Monongahela, Pa.

The Stauffer Chemical Company of New York City is a major producer of industrial and agricultural chemicals. Many of its 52 plants around the country make or process highly corrosive chemical solutions. In the past, equipment at the Chauncey and Monongahela plants had to be replaced about every two years because of corrosion—particularly at pipe joints and threadings. This meant a plant shutdown or a cut in production to make the necessary repairs.

In 1954, after experimenting with other materials, the company decided Stainless Steel was the most suitable metal. It was then used to replace vital parts in equipment. Here are the results at Stauffer's Monongahela plant according to Plant Manager, William R. Boyles: "Stainless Steel has definitely solved most of our problems of equipment replacement. We no longer suffer periodical shutdowns or delays in production because of corroded equipment. Stainless Steel has proven its effectiveness against corrosion. It has saved us time and money. We have had our Stainless Steel equipment in continuous use since the day it was installed—and it's still in excellent condition. In fact, we expect it to last for 15 years—maybe longer."

End corrosion losses in your plant. Build and repair with Stainless Steel. USS Stainless Steel is available through your U. S. Steel representative or your local Steel Service Center.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

USS

United States Steel

Shown here are 33 of the 42 tank cars which will be lined in a single month by Lithcote. These cars, however, represent only a part of Lithcote's monthly protective coating application.

HERE'S HOW LITHCOTE CUTS THE HIGH COST OF CORROSION CONTROL

Lithcote Corporation is a corrosion and contamination control *specialist* . . . a pioneer in the manufacture *and* application of internal and external protective coatings for equipment of all kinds.

Only durable, proved baked-on linings and coatings are applied by Lithcote Corporation—our own time-tested Lithcote line as well as the best of the many other recognized name brands. Furthermore, with our new oven equipment, sprayed Plastisol (PVC) materials may now be applied to *any piece of equipment which can be* transported by truck or rail. Plastisols provide for the resistance of sheet rubber *without seams*, in thicknesses up to 1/8".

Lithcote is also your dependable source for:

AMERCOAT, BISONITE, COLUMBIA #7, COPON, UNICHROME

PARTIAL LIST OF EQUIPMENT COATED OR LINED BY LITHCOTE

PROCESSING
STORAGE TANKS
TANK CARS
VACUUM TANKS
EDIBLE OIL TANKS
FATTY ACID TANKS
FILTER PRESSES
FRUIT JUICE CONTAINERS
LIQUID SUGAR TANKS
TRAYS
DRYING EQUIPMENT
CHEESE VATS
MILK STORAGE TANKS
WHEY TANKS
CARBONATED BEVERAGE EQUIPMENT
WATER TREATING EQUIPMENT

TRANSPORTATION
The many products transported in Lithcote lined tank cars and trucks include:
LATEX
FORMALDEHYDE
ACETALDEHYDE
INVERT SUGAR
EDIBLE OILS
VINEGAR
TALL OIL
CAUSTIC SODA
CARBON BISULPHIDE
PLASTICIZERS
EMULSIONS
CARBON TETRACHLORIDE
GLYCERINE
ALCOHOLS
WINES
CORN SYRUP
FATTY ACIDS
TRANSFORMER OIL
ACETIC ANHYDRIDE
SULPHURIC ACID
LARD
LACQUERS
PHENOL
TRIETHANOLAMINE

CHEMICAL AND PHARMACEUTICAL
STORAGE, MEASURING, FERMENTING AND MIXING TANKS
CAST IRON FILTER PRESS PLATES AND FRAMES
VACUUM DRYERS, INCLUDING DRYER PANS
EXHAUST FANS AND DUCT SYSTEMS
PIPE AND FITTINGS
CENTRIFUGES AND CENTRIFUGAL BASKETS
PUMP CASINGS AND OTHER PARTS
AGITATORS AND MIXING EQUIPMENT
TRUCK TANKS
RAILWAY TANK CARS VALVES
TROUGHS, HOPPERS AND CONVEYORS

PULP AND PAPER
WACO FILTER VATS AND CYLINDERS
PERFORATED AND SLOTTED SCREEN PLATES
FOURDRINIER PARTS
INLET AND OUTLET BOXES
HEAD BOXES
SAVEALL and DECKER VATS
WHITE WATER BOXES
STOCK CANALS
STOCK VALVES
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REGULATOR AND INDICATOR BOXES

PETROLEUM
The same Lithcote experience in corrosion control is available to the Petroleum Industry for the internal and external coating of pipe and other equipment.

ASK FOR YOUR LITHCOTE CATALOG

LITHCOTE CORPORATION
5000 W. Lake St., Melrose Park, Ill. • 42 Belden Ave., Norwalk, Conn.
36 W. 44th St., New York 36, N. Y.

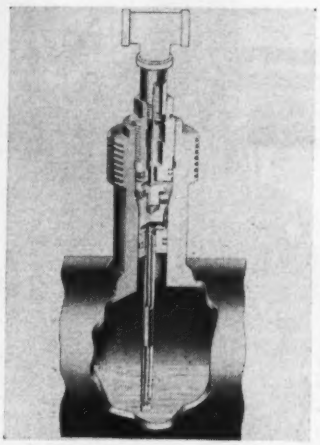
Check 3967 opposite last page.

No system shut-down in sampling line fluids

Uses: Taking product samples in corrosion surveys.

Features: Tool permits line fluids or gases to be sampled at will without system shut-down.

Description: Tube-type product sampler consists of access fitting body. Bore has tapered seat and threads to accommodate stainless steel gage carrier plug. Lower end of plug accommodates blocking and packing nut of stainless steel. Hollow sampling tube is suspended from this nut.



Corrosion sampler in service

In operation, pressure forces line fluid or gas through entry port of sampling tube. Material then passes narrow annular space between tapered seat and gage carrier plug. Next, product passes through series of bypass holes into hollow top bore of plug. It is finally conveyed to surface and recovered for analysis.

(Tube-type sampler is development of Cosasco Division, Perfect Circle Corporation, 11655 McBean Dr., El Monte, California.)

Check 3968 opposite last page.

Filled-Teflon bearings, for corrosive service, are detailed in Bul CP-558 — Chemical & Power Products, Inc., 9 Broadway, New York 4, N.Y.

Check 3969 opposite last page.

Which valve alloy?

Corrosion testing, which often includes analysis of test specimens like those shown above, insure Aloyco valve customers of the right alloy for each job. Typical metals used in Aloyco Valves: Types 304 and 316 Stainless Steel, Aloyco 20, Nickel, Monel, Hastelloy B, C and D.

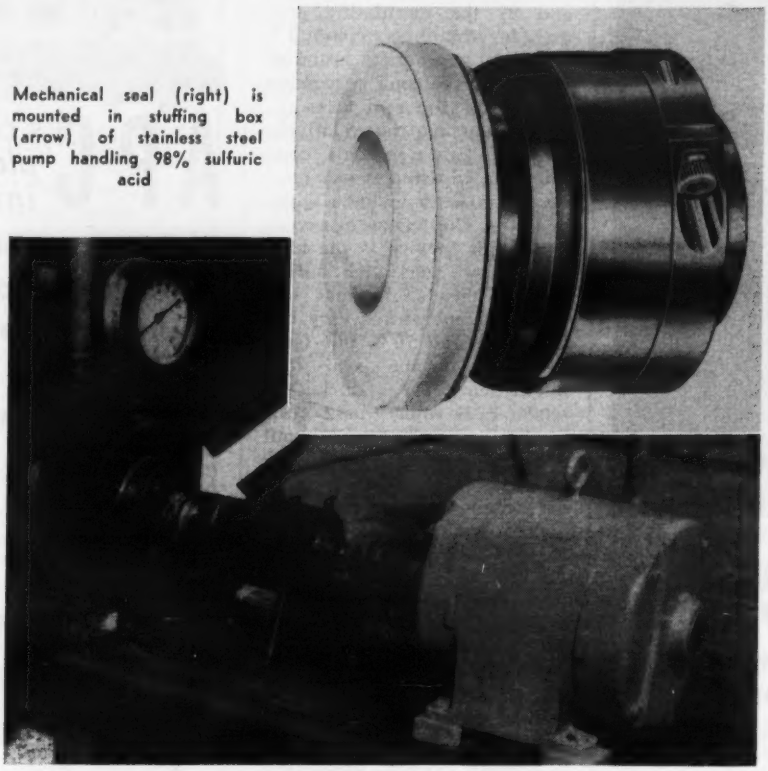
At Aloyco, 30 years experience in stainless steel valves exclusively is at your service. Our field consulting service is yours for the asking.

On your next valve job call in the specialists . . . write Alloy Steel Products Company, 1302 West Elizabeth Avenue, Linden, New Jersey. 9.14

Longer Lasting ALOYCO VALVES

ALLOY STEEL PRODUCTS COMPANY
Linden, New Jersey

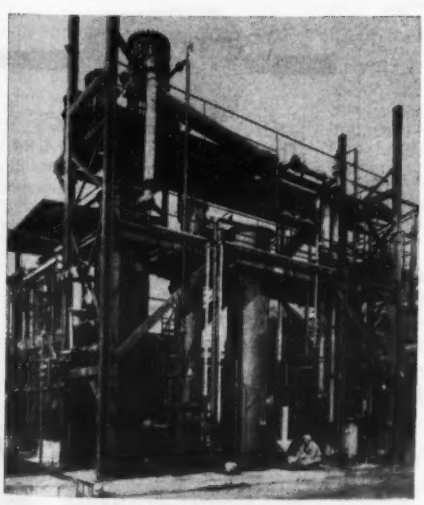
Check 3970 opposite last page.



Mechanical seal (right) is mounted in stuffing box (arrow) of stainless steel pump handling 98% sulfuric acid

While former seals used on acid pumps failed frequently causing shutdowns—

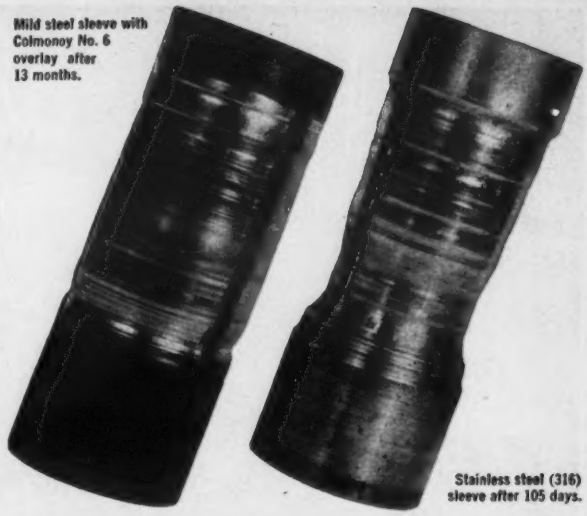
Corrosion-resistant mechanical seals operate 27 months without downtime



Problem: Kolker Chemical Corporation of Newark, New Jersey, experienced considerable difficulty in maintaining seals in acid service pumps used to circulate 98% sulfuric acid to scrubbing towers. Since the pumps, stainless steel units handling about 20 gpm of the acid at an 80 head, are in 24 hour service, a night failure of a seal often resulted in a shutdown of a scrubbing tower for eight to twelve hours. This caused contaminated product and additional process interruptions in subsequent operations.

Two different styles of seals were tried and they failed because of one or both of two reasons: 1) severely corro-

◀ Operator checks one of acid pumps (arrow) at Kolker Chemical



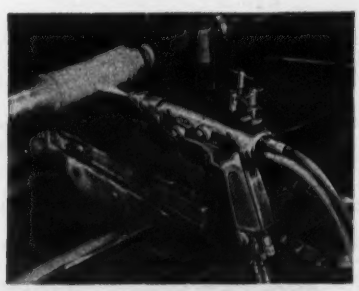
Mild steel sleeve with Colmonoy No. 6 overlay after 13 months.

Stainless steel (316) sleeve after 105 days.

Colmonoy Hard-Surfaced Mild Steel Pump Sleeve Lasts Longer Than Stainless Steel Sleeve

Here's dramatic evidence of how Colmonoy hard-surfacing alloys can lower maintenance costs. Both pump sleeves (above) served in a Desalta charge pump, moving crude oil. The one at the right, made of 316 stainless steel, was photographed after 105 days in service (involving eight packing changes). The other one, made of mild steel with a sprayed overlay of Colmonoy No. 6 alloy, served over three times as long (with just one repacking), yet suffered much less wear.

Colmonoy No. 6 is a wear-resistant nickel-base alloy incorporating chromium borides and carbides. The powdered alloy is sprayed on with the Colmonoy Spraywelder, as shown. The smooth sprayed overlay is then fused to the base metal with an oxy-acetylene flame to form a solid, non-porous, wear-resistant overlay.



WRITE RIGHT NOW
For the Colmonoy Spraywelder Catalog and Hard-Facing Manual No. 79

HARD-SURFACING AND BRAZING ALLOYS

WALL COLMONOY CORPORATION

19345 John R Street • Detroit 3, Michigan

BIRMINGHAM • BUFFALO • CHICAGO • HOUSTON • LOS ANGELES
MORRISVILLE, PA. • NEW YORK • PITTSBURGH • MONTREAL • GREAT BRITAIN

Check 3971 opposite last page.

with new **Carbo Zinc 11***

CARBOLINE'S NEW ZINC FILLED *INORGANIC* COATING FOR GALVANIC PROTECTION OF STEEL

Becomes water insoluble 20 minutes after application

Sudden rainfall, night condensation or rising tide will not wash it off or affect curing.

Carbo Zinc 11 is not only a new coating, it is a new *concept* in zinc filled inorganic coatings, with desirable properties not found in other protective coatings. In only 20 minutes the coating becomes insoluble in water. It can be applied directly to damp surfaces, in 90-100% humidity and at temperatures as low as 0°F.

Only one coat provides long-lasting galvanic protection to steel surfaces in marine, coastal and offshore environments. It is also insoluble in organic solvents, and is highly recommended for lining of solvent storage and cargo tanks. And look at its other outstanding characteristics:

- Prevents subfilm corrosion
- Excellent water, brine and solvent resistance
- Economical — low material, surface preparation and application costs
- Does not blister — cures from inside out
- No curing solution required
- Brush or spray application
- In non-immersion service, can be applied over a commercial blast, brush blast or wirebrushed surface

Write today for complete information, technical data, uses and sample of this remarkable new coating—Carbo Zinc 11.

**carboline COMPANY*

*Patent applied for

32-B Hanley Industrial Ct.
St. Louis 17, Mo.

Specialists in Corrosion Resisting Coatings and Linings

Check 3972 opposite last page.

sive operating conditions affecting metal parts of seal, and 2) the circulating acid used for scrubbing picks up a reaction byproduct granular in nature causing excessive wearing of the seal faces.

Even during the relatively short life of these seals, considerable adjustment was necessary to keep leakage within limits. One cause of severity of this service is the high temperature generated during process upsets. Normal operating temperatures vary between 35 and 70°C but temperature at the seal face might reach 100°C during an upset. Seal replacement costs for a single pump were about $200 per year.

Solution: A new type of corrosion-resistant, high-temperature mechanical seal was tried. Known as the Chemiseal, it is a chemically impervious, pressure-balanced seal with a spring loaded Teflon bellows. It is capable of operating at 75°C at 100 psi or 100°C at 75 psi and shaft speeds up to 2000 fpm without cooling.

Results: Since installation of new seal, there has been no downtime for maintenance for more than twenty-seven months. All pumps at Kolker, now in sulfuric acid scrubbing tower service, are equipped with the mechanical seals, which are providing trouble-free service.

(Chemiseal mechanical seal is product of The Garlock Packing Company, Palmyra, N. Y.)

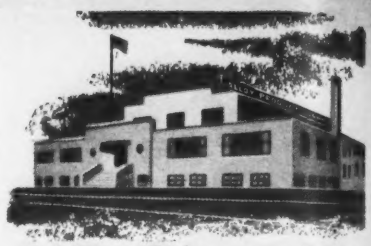
Check 3973 opposite last page.

SiC sleeves on digester cut replacement costs more than 80%

Self-bonded and impervious form of compound used

Costs for replacing alloy wear sleeves of digester were reduced 80% and downtime was reduced substantially with use of sleeves formed of self-bonded, impervious form of silicon carbide.

Brevity of sleeve life was serious problem at The Barrett Division of Allied Chem-



A-P-C *'s complete plant integration*

spells complete quality control for your stainless steel components

A-P-C does all your work under one roof — one supervisory staff — one management. Total responsibility is in the hands of A-P-C, for A-P-C is perhaps the most completely integrated stainless steel fabricating plant in the country.

Manned by personnel who are craftsmen exclusively in stainless steel, every phase of production is under their control from the original steel plate to the finished end product or component.

Engineering, drawing (and in deep intricate shapes), heat treating, pickling, skilled welding, machining, polishing — there is not a single operation which is not under A-P-C's direct management.

That's why when you buy A-P-C, you can be certain of absolute dependability. Write for estimates, send drawings or request engineering consultation. They're yours for the asking.

ALLOY PRODUCTS CORP.

1075 Perkins Avenue

Waukesha, Wis.

Check 3974 opposite last page.

ical Corporation, Dubuque, Iowa, producer of structural board for building trade.

Digesters work with soda-base liquor under 150-psi steam. In final stage, impeller accelerates pulp slurry through discharge valve into wear sleeve, after which slurry is expanded and blown into cyclone storage tanks.

Alloy sleeves previously used would wear out in 48 to 75 hours, interrupting normal operating cycle of 240 hours. Substitution of silicon-carbide sleeves with 20 times the life—1700 hours—minimized downtime for replacing sleeves.

Improved silicon carbide is comprised of approximately 97% pure silicon carbide, self-bonded and free from weakening interstices such as are present with secondary bonds. Surface silicon-carbide molecules constitute tight abrasion-resistant lattice of chemically inert impervious material.

Formable into most shapes common to standard ceramic techniques, dimensional tolerances in unground condition can be held to ±0.010". Surface finishes as low as five micro inches can be obtained by diamond grinding.

(KT silicon carbide is development of The Carborundum Company, Niagara Falls, N.Y.)

Check 3975 opposite last page.

"I'd like to promote you to a more responsible job. The only thing that holds me back is a little common sense!"

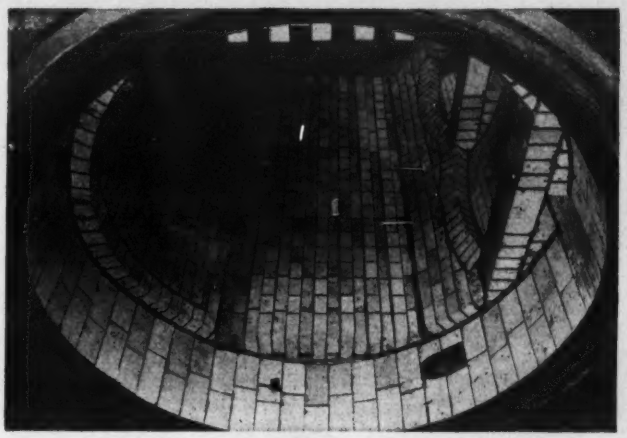
St. Louis Firm Brings Advanced Old World Techniques to the New . . .

Engineering, Fabrication and Application of Pre-Stressed, Ceramic Linings Introduced to U.S. by CORROSION-PROOFING

Years-ahead methods used by West German engineers and scientists to achieve greater control of thermal and chemical shock are now available to American industry through Corrosion-Proofing of St. Louis, Missouri. The new techniques from Europe represent an important stride toward greater corrosion control.

Corrosion-Proofing is the first U. S. firm to offer engineering, fabrication and application of pre-stressed, ceramic linings for chemical vessels and steel process equipment. Extensive field experience proves that these linings are superior to alloys in absorbing thermal and chemical shock.

Corrosion Proofing—offering the engineering, fabrication and application of pre-stressed, ceramic linings; pre-stressed, plastic linings; cured, reinforced resinous linings and elastomeric and liquid linings—invites your inquiry. Brochure is available upon request.



SECTION OF WEST GERMAN REACTOR VESSEL SHOWING PRE-STRESSED BRICKWORK LINING IN STEEL SHELL

CORROSION-PROOFING

DIVISION OF SHUTT PROCESS EQUIPMENT CORP.
5627 MANCHESTER AVE. • ST. LOUIS 10, MISSOURI

Check 3976 opposite last page.

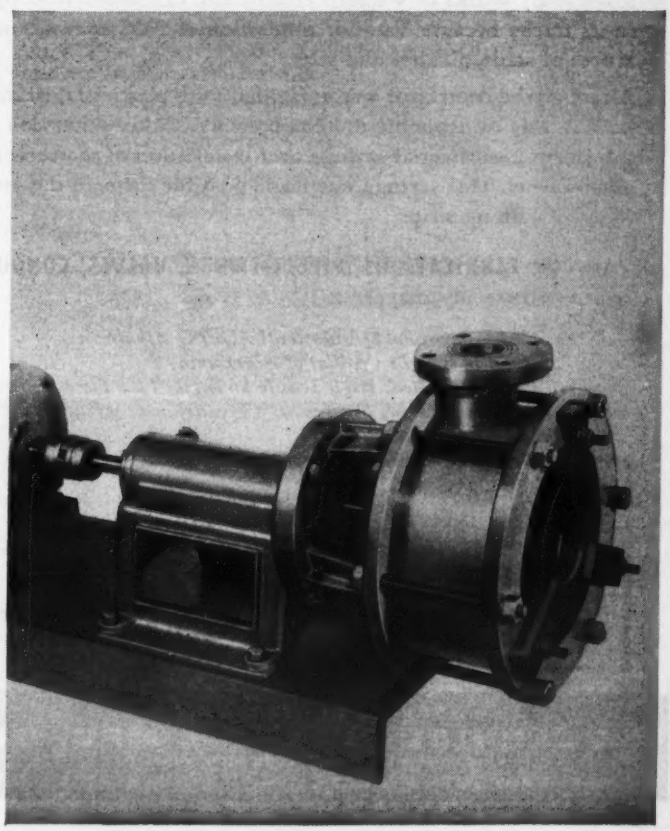
ANOTHER VANTON FIRST:

ALL-PVC CENTRIFUGAL PUMP

NEW PLASTIC UNIT RESISTS CORROSION AND CONTAMINATION

As usual, Vanton is first in another plastic fluid handling innovation: an all-PVC centrifugal! All wetted parts of this new pump are constructed of unplasticized, unmodified polyvinyl chloride, offering the broadest possible resistance to chemical corrosion, **PLUS** non-contaminating transfer of sensitive solutions, **PLUS** a cost lower than most alloy pumps for similar applications!

CHECK THESE RUGGED CONSTRUCTION FEATURES:
Cast iron frame gives rigid support and protection to heavy, sectioned PVC casing. **Molded, balanced-design impellers** — contoured vanes give maximum energy-transfer efficiency. **Low-friction roller bearings,** widely spaced to reduce loading, provide quiet operation. **Ample grease reservoir** prolongs bearing life. **Rigidity of construction** — this heavy-duty bearing pedestal can really take it! **Latest-design mechanical seals** — Fluid contacts only facings of rotating and stationary rings. Wide range of materials available cover virtually all corrosive applications. **Rotating rings** in DuPont Teflon or carbon. **Stationary rings** in ceramic or Stellite, reversible for additional use after extended periods of service.



WRITE FOR LITERATURE TODAY!

VANTON PUMP & EQUIPMENT CORP.

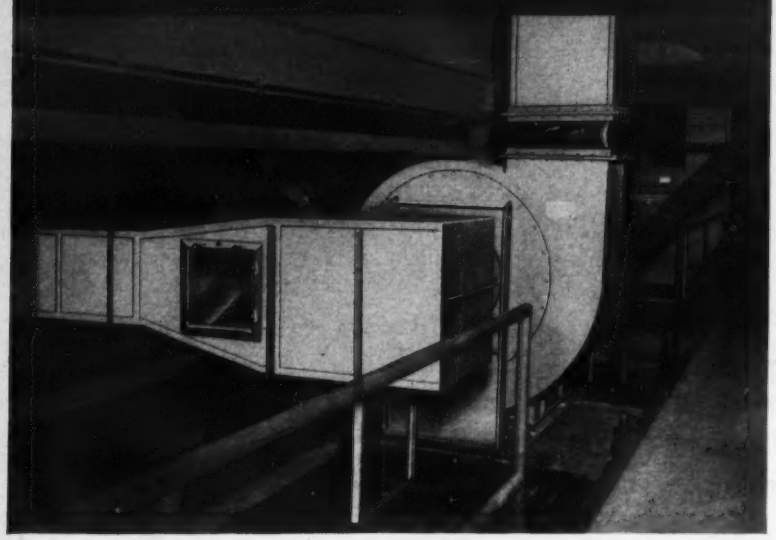
DIVISION OF COOPER ALLOY CORP., HILLSIDE, N. J.

SPECIALISTS IN PLASTIC FLUID HANDLING. PLASTIC PUMPS, VALVES, PIPING, FITTINGS, SPECIALTIES

Check 3977 opposite last page.

problem: **Corrosive Acid Fumes**

solution: **Van-Cor Exhaust Duct System**

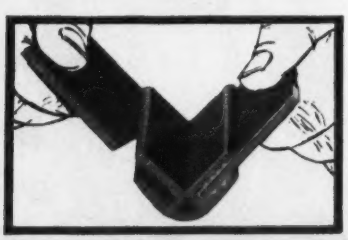


OVER 50,000 SQ. FT. OF VAN-COR SHEET AND JOINING STRIPS remove all acid, plating and cleaning fumes throughout the Allentown (Pa.) Works of Western Electric Co. Corrosion is stopped in its tracks because Van-Cor unplasticized PVC is resistant to scores of acids, alkalies and salts.

Although the contractor was unfamiliar with plastics fabrication, he was able to assemble the components of this system on the job site at a substantial savings over installation of prefabricated components. This savings was made possible through the use of Van-Cor joining strips.

VAN-COR FABRICATIONS, PIPE, FITTINGS, VALVES, CONDUITS offer *you* these advantages:

1. *Resist Corrosion of Industrial Acids & Alkalies*
2. *Light in Weight (⅙ that of Aluminum)*
3. *Easily Installed; High Tensile Strength; Low Flow Resistance*
4. *Readily Formed, Machined, Threaded and Welded*



Van-Cor 90° and H Joining Strips
The fast, low-cost way
to connect PVC sheet stock.

Write for Catalog and Name of Nearest Distributor

INDUSTRIAL DIVISION OF . . .
COLONIAL PLASTICS MFG. CO.
Subsidiary of THE VAN DORN IRON WORKS CO.
2685 EAST 79TH STREET CLEVELAND 4, OHIO

Check 3978 opposite last page.

CORROSION CONTROL

Glass fiber ventilators resist corrosion

Centrifugal power ventilators are being offered with glass fiber housings to resist chemicals and fumes. Housings absorb noise.

Capacities from 180 to 13,500 cfm are available in line of 44 belt-drive and 17 direct-drive units. Stainless steel air flow guides eliminate internal air shocks.

(Fiber-Aire ventilators are available from The Swartwout Company, 18511 Euclid Ave., Cleveland 12, Ohio.)

Check 3979 opposite last page.

Nonylphenoxyacetic acid effective corrosion inhibitor

For petroleum-based fluids and synthetic lubricants

Research studies show that nonylphenoxyacetic acid serves as an excellent corrosion inhibitor for ferrous metals in a variety of petroleum-based fluids. It also works well in synthetic lubricants such as silicones. Water-soluble alkali-metal or amine salts are good inhibitors in aqueous systems.

Protecting ferrous metal surfaces from corrosion by being adsorbed on them to provide a closely packed protective film, nonylphenoxyacetic acid is convenient to use. It is readily soluble in petroleum and synthetic fluids and other organic systems over a wide temperature range. It is insoluble in water, minimizing the tendency for the protective film to be desorbed by being leached into the aqueous phase.

The inhibitor's rust-preventive properties persist in the presence of other additives such as emulsifying agents and antioxidants. It appears to be compatible with these agents. As a liquid, nonylphenoxyacetic acid can be readily adapted to a variety of blending techniques. It is substantially all-organic in nature, leaving little or no ash on combustion.

The structural features of

Call in a DURA MAN

for expert advice on mechanical sealing...

DURA SEAL

Sales and Service is Nation-wide

Mechanical sealing service at its best! Fifty-six trained men working out of thirty area offices offer assistance in meeting your sealing needs.

The PERFECT SEAL TRADE MARK

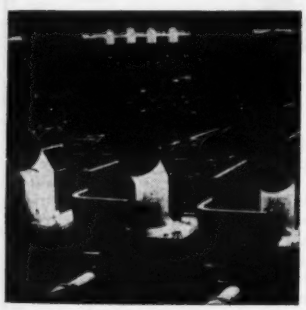
DURAMETALLIC CORPORATION
KALAMAZOO, MICHIGAN

Check 3980 opposite last page.

the acid combine to present an efficient corrosion inhibitor of marked stability to chemical attack, such as hydrolysis by acid or alkali, or by oxidation. It has exhibited no tendency toward metal dissolution over a wide range of use concentrations. Such metal dissolution is frequently the cause of surface staining and depletion of the inhibitor below effective concentrations.

(Condensed from technical paper, "A Laboratory Study of the Rust Preventive Properties of Nonylphenoxyacetic Acid in Some Petroleum Products." Paper was presented at the National Association of Corrosion Engineers 1959 Annual Meeting in Chicago. Authors are Robert M. Pines and Dr. John D. Spivack, Geigy Chemical Corporation, Saw Mill River Road, Ardsley, New York.)

Check 4328 opposite last page.



Risers made of acrylic

. . . solve corrosion problem at American Potash & Chemical Corporation's Henderson, Nev., plant where they are used to conduct hot, moist hydrogen resulting from conversion of sodium chlorate to sodium perchlorate.

Fabricated from sheet stock, the plastic pipes resist corrosion by chlorate splash salts.

Acrylic risers have been in use since May 1958, and are still in good condition.

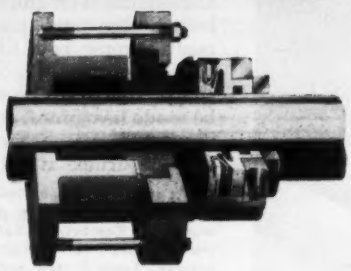
(Plexiglas stock from which risers were fabricated is product of Rohm & Haas Company, Washington Square, Philadelphia 5, Pa.)

Check 3981 opposite last page.

These characteristics of
CAMBRIDGE METAL-MESH BELTS
give you fast, low-cost, uniform chemical processing
Whatever you process or package — slab, sheet, pelletized or powdered materials — Cambridge Metal-Mesh Belts combine movement with processing to give you greater production and consistently high quality without costly manual handling.
Open mesh construction allows heat, cold or liquids to flow through the belt and around the product for fast, thorough processing. Liquids drain off quickly, completely. Superior belt design and manufacturing techniques mean longer belt life, fewer repairs, lower operating costs. Smooth belt surface has no sharp edges; can be easily cleaned. Belts can be made heatproof, coldproof, acid proof — in any mesh, weave, metal or alloy — with any side or surface attachments.
Call your Cambridge Field Engineer now. He'll be glad to discuss any aspect of Cambridge Belts — from manufacture to installation and service. Look in the yellow pages under "Belting, Mechanical". Or, write for FREE 130-PAGE REFERENCE MANUAL.
CONVEYOR BELTS
The Cambridge Wire Cloth Co.
Department F • Cambridge 9, Md.
Manufacturers of Wire Cloth, Metal-Mesh Conveyor Belts, Wire Cloth Fabrications

Check 3982 opposite last page.

LAST LONGER IN CORROSIVE CHEMICALS



Garlock Chemiseal® Mechanical Seals possess greater immunity to corrosion and are more economical than any other design offered. This reputation is based on fact—customers report unsurpassed performance on applications like these:

- **Pumping HYDROXYACETIC AND SULFURIC ACID**
  1750 rpm, 1½" shaft. 10 lbs. suction, 60 lbs. discharge. Temperature of medium 30° C. RESULT: Chemiseal greatly extended service life.
- **HIGHLY ABRASIVE SERVICE (ESTER—10% SOLIDS SLURRY)**
  3600 rpm. 625 lbs. discharge, 30 lbs. suction. Stuffing box pressures 15 lbs. to 65 lbs. Temperature of medium 70° C. RESULT: Chemiseal gave longer, leak-proof operation.
- **Pumping CONCENTRATED SULFURIC ACID**
  1750 rpm. 1⅛" shaft. 2 lbs. suction. 45 lbs. discharge. Temperature of medium 65° C. RESULT: Chemiseal gave longer life.
- **Pumping ADIPIC ACID AND HYDROCARBON SLURRY**
  1750 rpm. 1⅛" shaft. 35 lbs. suction, 75 lbs. discharge. Temperature of medium 70° C. RESULT: Chemiseal lasted longer, cut downtime.

Join the list of satisfied users. You can apply standard Garlock Chemiseal Mechanical Seals to all pump shafts from ⅛" to 2⅛". Special sizes also available. They seal against all mediums—including solids in suspension—in pressures to 100 psi at 75° C, or 75 psi at 100° C. Chemiseal Mechanical Seals are another of the Garlock 2,000 . . . two thousand different types of gaskets, packings, and seals for every need. Find out complete details by contacting your local Garlock representative, or write for Catalog AD-164.

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Molded and Extruded Rubber, Plastic Products

Canadian Div.—The Garlock Packing Co. of Canada Ltd. • Plastics Div.—United States Gasket Co.

Check 3983 opposite last page.

CORROSION CONTROL

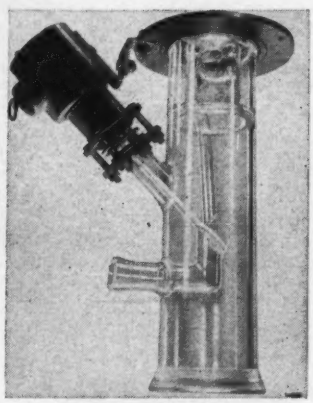
Reflux-splitting operation is open-book to observer

Pyrex/Teflon construction also precludes corrosion

Uses: Column or in-line reflux splitting applications.

Features: Pyrex/Teflon construction provides full visibility of product flow and corrosion resistance to all liquids except hydrofluoric acid and hot concentrated caustics.

Description: In reflux splitters, Teflon gate is only moving part in operation, timer (which has adjustable ratio



Reflux splitters constructed entirely of Pyrex and Teflon will stand thermal shock of 200° F

range of 1:1 to 1:120) energizes solenoid. Glass-enclosed cord pulls up Teflon gate to open reflux line.

Splitters are available in column designs of 3 to 9" and in-line design of 1, 1½, and 2". Pressure range is 15 to 50 psi, with max temperature of 450°F. Unit will withstand thermal shock of 200°F.

(Automatic reflux splitters are product of Chem Flow Corp., 119 Dell Glen Ave., Lodi, N. J.)

Check 3984 opposite last page.

Welding scale in pipe is forestalled

Danger of valve and/or pipe failure, caused by formation of welding scale in hydraulic pipe systems of Forrestal Class of aircraft carriers, has

BARNSTEAD

BANTAM DEMINERALIZER

DOES 5 WATER PURIFICATION JOBS EMPLOYS 5 INTERCHANGEABLE CARTRIDGES

STANDARD CARTRIDGE Produces ion free water at minimum cost . . . removes 1500 grains as NaCl (1300 as $CaCO_3$).

MIXED RESIN CARTRIDGE For operations demanding better than 1,000,000 ohms resistance and neutral pH. Cartridge capacity is 1230 grains as NaCl (1050 at $CaCO_3$). Approximately ⅜ of cartridge capacity is million ohm water or better.

ORGANIC REMOVAL CARTRIDGE Removes organics, organic liquids and gases that would pass through a demineralizer. Effective in removing chlorine. Ideal for pre-treating demineralizer feedwater, for self-purifying high purity rinse systems and other processes where organics or odors in the water are objectionable.

OXYGEN REMOVAL CARTRIDGE Developed for cooling water loops where it is important to maintain low oxygen content to prevent corrosion. Cartridge removes one part per million of dissolved oxygen from 2500 gallons of water, or 6.8 liters (9.7 grains) of oxygen at standard temperature and pressure.

CATION CARTRIDGE Provides (1) precious metals recovery, (2) radio-active isotope recovery, at low cost, (3) also useful for removing volatile amines where heating plant steam condensate is being used as the feedwater for a Still, and (4) where close control over the pH of water is necessary, the cation cartridge in its ammonia or lithium form is effective.

Write for Literature

Barnstead

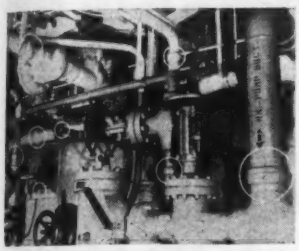
STILL AND STERILIZER CO.

66 LANESVILLE TERRACE BOSTON 31, MASS.

Check 3985 opposite last page.

been virtually eliminated by utilization of scale-free type couplings.

Coupling has circumferential cavity immediately below welding bevel. This permits



White circles indicate scale-free couplings as utilized in No. 1 elevator machinery room of Forrestal Class aircraft carrier

welder to obtain complete penetration in final weld with no danger of burning through, or formation of icicles or scale inside pipe. Solid back-up ring under welding bevel facilitates X-ray inspection.

(SF couplings are product of Tube Turns, Division of Chemetron Corporation, 222 E. Broadway, Louisville 1, Kentucky.)

Check 3986 opposite last page.

Acids, alkalis in solvents resisted by diaphragms of valves

Useable up to 160°F

Viton synthetic rubber diaphragms which resist acids and alkalis separately or in combination with organic solvent have been developed for manufacturer's valves.

Usable at temperatures up to 160°F, diaphragms will withstand such concentrated acids as sulfuric, phosphoric, chloroacetic, cresylic, carbolic, and hydrochloric. They will not resist glacial acetic acid.

Solvents such as carbon disulfide, perchloroethylene, xylene, and turpentine may be used.

(Viton-diaphragm valves are product of Automotive Rubber Company, Inc., 12550 Beech Rd. at P.M.R.R., Detroit 39, Mich.)

Check 3987 opposite last page.

Chemical Show — Booth 1002
Coliseum — New York
November 30 — December 4

How B&W JOB-MATCHED STAINLESS PIPE saves time and money in corrosive service

At B&W, you can select the most economical stainless steel pipe for *your* service conditions, because...

- ...the right grade and size is available—seamless or welded.
- ...you get the stainless properties, in the right combination, to simplify bending, forming, and other fabrication operations.
- ...you benefit from B&W's long experience in matching pipe and tubing to process industry applications.

For more information on how you can order B&W Job-Matched Pipe—and B&W Job-Matched Fittings—all from one source, call the tubing specialist at your local B&W District Sales Office. Or write for Bulletin TB-410. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

B&W THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION

TA-9018-52

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

Check 3988 opposite last page.

Republic ELECTRUNITE "Dekoron-Coated"

E.M.T. outlasts standard conduit 10 to 1

At one time, the highly corrosive atmospheres of paper making at the Charmin Paper Products Company, Green Bay, Wisconsin, combined with moisture to corrode standard conduit so badly that it had to be replaced as often as every six months. Then, Republic ELECTRUNITE® "Dekoron®-Coated" E.M.T. was used. Six years later, much of the original ELECTRUNITE installation is still in service. ELECTRUNITE "Dekoron-Coated" E.M.T. costs less to install, less to maintain. Call your electrical distributor or write for FREE folder DEK-3.

REPUBLIC STEEL

STEEL AND TUBES DIVISION

207 East 131st Street • Cleveland 8, Ohio

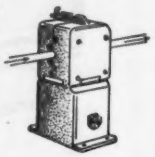
Check 3989 opposite last page.

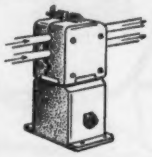
PUMPING IDEAS

POSSIBLE ONLY with a SIGMAMOTOR PUMP

MOVE CORROSIVE LIQUIDS

Material being pumped never comes in contact with pump mechanism. Wave-like motion of steel fingers forces material through Tygon tubing. By changing size of tubing, capacity can be increased or decreased. Pump housing opens for removal and insertion of tubing.



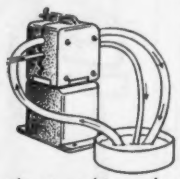


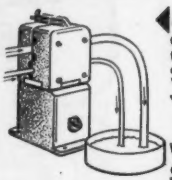
PUMP 2 OR 3 DIFFERENT LIQUIDS SIMULTANEOUSLY

Some models will accommodate up to four tubes so that four different liquids can be passed through the pump at one time without danger of contamination.

FEED AND MIX

One or more tubes can be feeding material to a mix while a larger tube is recirculating the liquid to produce agitation and thorough mixing. Viscous materials can be pumped without danger of gumming or plugging. Remove tube and pump is clean.





METER ADDITIVES

One or more additives can be pumped to a solution in the exact amount desired by selecting the correct size of tubing and regulating pump speed. Various controls can be incorporated to close valves ahead of pump.

Capacities from 0.5 cc. per min. to 4.5 G.P.M.

Write for complete information on sizes and capacities.

SIGMAMOTOR, INC.

18 N. Main Street • Middleport, N. Y.

Check 3990 opposite last page.

NOW!

THROTTLABLE GATE VALVE IN PLASTIC

■ CHEMICALLY RESISTANT ■ NON-CONTAMINATING ■ NON-GALLING ■ NOT SUBJECT TO GALVANIC CORROSION ■ EASILY MAINTAINED ■ LIGHT WEIGHT ■ LOW COST ■ FLEXIBLE CAP ABSORBS ABRASIVE ACTION OF SUSPENDED SOLIDS ■ NO-PRESSURE-DROP FULL FLOW

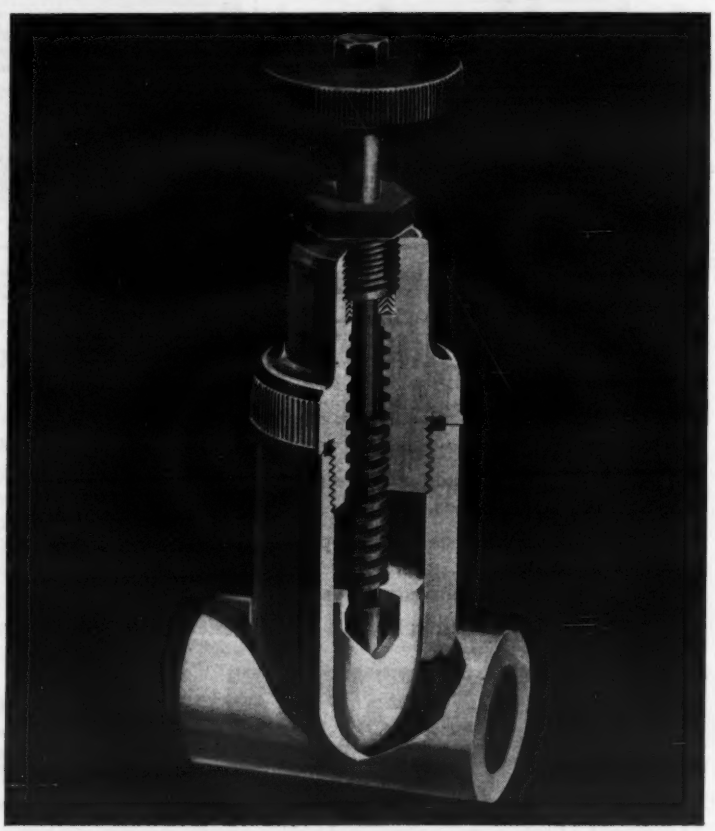
Here's a unique new valve design, in plastic, that combines the full-flow, non-pressure-drop characteristics of a gate valve with close throttling control usually possible only in a globe valve! Unique Design: This plastic valve is not a carry-over of metal valve designs; rather it is a completely new design conceived in plastic: the ONLY plastic gate valve that is also throttlable for flow control. Easy replaceability of flexible synthetic cap minimizes maintenance. When fully open valve backseats, taking pressure off DuPont Teflon V-ring packing. Use it for all your corrosive, contaminable, and run-of-process fluid handling situations. Available in PVC, Kralastic, or Penton all-plastic construction, in ½"-2" sizes, and with screwed, socket-weld, or flanged ends.

WRITE FOR LITERATURE TODAY!

VANTON PUMP & EQUIPMENT CORP.

DIVISION OF COOPER ALLOY CORP., HILLSIDE, N. J.

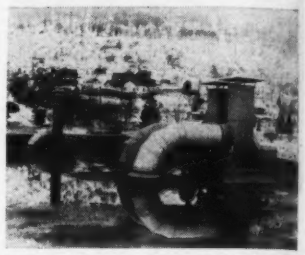
SPECIALISTS IN PLASTIC FLUID HANDLING. PLASTIC PUMPS, VALVES, PIPING, FITTINGS, SPECIALTIES



Check 3991 opposite last page.

Ductwork durability pinned on PVC

PVC ductwork has been installed to vent corrosive acid fumes developed during metal plating operations at Zippo Mfg. Co. in Bradford, Pa.



To hold corrosion of acid fumes in check, PVC ductwork has been installed at Zippo

Prior ductwork, fabricated of metal with corrosion resistant paint coating, failed after 3½ years of exposure to fumes from chromic, sulfuric and hydrofluoric acids.

(Ducts were fabricated of PVC sheets which are product of A. M. Byers Company, Clark Bldg., Pittsburgh, Pa.)

Check 3992 opposite last page.

Plastic spigot

. . . and key for use in filter presses and in applications where bulk liquids are handled, has smooth bore with no cracks to gather contamination. Spigot is compression-molded of phenolic. It measures 9¼" in length and is tapered from 1½ to ⅞". Spigot is drilled to 9/16". Key, molded of same material, is tapered fit. It opens and shuts with half turn.

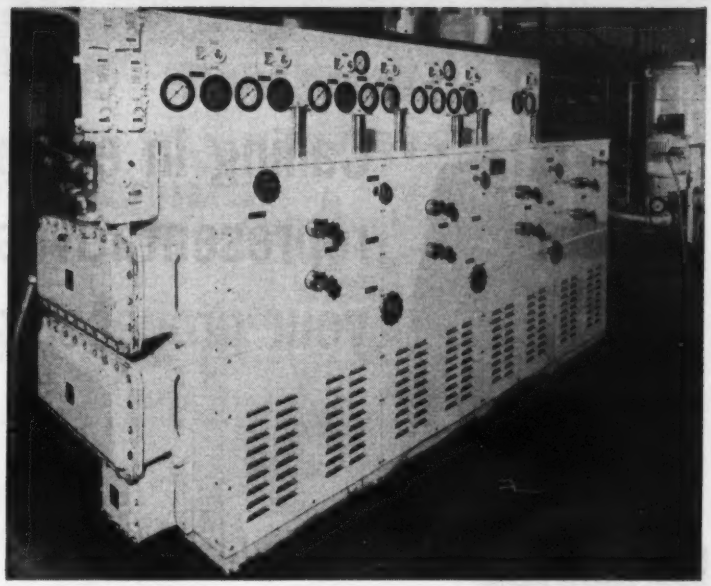
(Plastic spigot and key is available through Norton Laboratories Inc., Lockport, New York.)

Check 3993 opposite last page.

Automatic blender for oil additives improves customer service

Speedy unit has enabled Oronite Chemical to cut order lead time from ten to five days, with high-quality product being obtained through increased blending accuracy

GORDON WEYERMULLER, Petrochemical Editor
with **JOHN BLICKMAN,** Manager of Operations Planning
Oronite Chemical Co., San Francisco, Calif.



Console of automatic blender contains seven panels, permitting accurate blending of seven lube-oil additive components in one operation. Homogenizer is at right

Problem: Prior method of blending oil additives at the Oak Point, La., plant of Oronite Chemical was time consuming — requiring 18-24 hr to produce a 10,000-gal tankcar quantity.

Procedure involved use of several blending tanks. Various additive stocks were stored in individual tanks and then pumped to special blending tanks to obtain desired formula. Final product was then pumped to a tankcar for shipment. This method required considerable tankage. It also meant frequent testing, sampling, and reblending — all of which consumed valuable laboratory time and manpower.

Furthermore, after a tank car had been filled, there was a "heel" left over in blending tank. This heel had to be transferred to a special storage tank, which tied up tankage and inventories.

Solution: In September 1957, Oronite installed an automatic blending system for the oil additives. Machine used for this blending operation is explosion-proof. Seven individual panels on console permit seven different additive components to be blended in one automatic operation.

Unit is composed of two sections — one for proportioning and one for homogenizing. Simultaneous operation of these two sections is completely integrated and synchronized by controllers.

Proportioning

Function of the proportioning section is to continuously and simultaneously measure the individual components of the blend and deliver them to the homogenizer section. Each constituent is proportioned with an accuracy of 0.1% (volume) of its individual throughput. Automatic controls eliminate any air present in supply lines (which would otherwise destroy blend accuracy) and make it impossible for proportioning section to operate unless each constituent is supplied at the required rate.

Proportioning pumps employ vernier volume controllers, which position length of pump stroke. Several hundred calibrated divisions permit volume of each additive to be set to 0.05% or less. Design eliminates pressure differential across proportioning pump, preventing any tendency to bypass it.

Function of the homogenizer section is to thoroughly blend, disperse, deaerate, and dehydrate, where desired, the proportioned constituents of the blend, thus producing the finished blend.

Film method of homogenizing under vacuum is used, which employs a rotating disc. Proportioned, but unblended, material is fed into disc maintained at 27" Hg vacuum. Liquid flows out into disc in a thin film from under ring. Shape of disc and its rotational speed produce high turbulence in film, producing the shear for effective dispersion and homogenization. Discharge pump on the homogenizer section delivers the product to storage tank, tankcar, or containers.

Free Flow

Two primary considerations in operating the machine properly are that additive stocks flow freely and that they enter the machine at constant pressures and desired temperatures. To assure free-flowing material, it is necessary to eliminate air from additive stocks and to provide a constant, positive suction head on each panel pump.

To accomplish this, Oronite engineers installed a surge tank for each panel. Procedure for controlling temperature of incoming liquids was also set up.

Results: Automatic blender has been of great value in customer service. For example, it has enabled company to cut its order lead time from ten to five days. Blender can handle 90 gpm of additive. This means that a 10,000-gal tankcar can be filled in about two hours, compared to 18-24 hr under old method.

Since blender eliminates many of human factors — particularly when gaging additive transfers from one tank to another and measuring temperature — it provides greater blending accuracy. Plant estimates that accuracy has been increased at least 35%. This means a better quality product and one that can be blended to precise customer requirements.

Increased Efficiency

Automatic blender has enabled plant to increase production considerably and still keep operating requirements to one man. With former method, addition of another man would have been required with increasing production. Blending system has needed very little maintenance.

Since it has cut tankage requirements, blender has enabled company to eliminate capital expenditures for new

Calling in equipment representatives on your processing job?

Be sure one of them is from
AMERICAN-Standard
Industrial Division

You benefit by discussing equipment-selection with an engineer. American-Standard* Industrial Division is engineer-staffed from brass to branches. Combining three American-Standard divisions—American Blower, Ross Heat Exchanger, Kewanee Boiler – this new organization offers *one-source responsibility* for quality and performance in equipment designed, engineered, and manufactured to work together. There are offices in all principal cities; contact the one nearest you. American-Standard Industrial Division, Detroit 32, Michigan. In Canada: American-Standard Products (Canada) Limited, Toronto, Ontario.

Firebox, scotch-type steel boilers and package units for heat, power, steam.

Heat exchangers, condensers, and feed-water heaters for every requirement.

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Check 3994 opposite last page.

tankage and lines and to make more efficient use of plant area. It has also reduced laboratory time required for testing and sampling additive blends.

(Automatic blender is product of The Cornell Machine Co., 99 Wall St., New York 5, New York.)

Check 3995 opposite last page.

(For further information on lube-oil additives contact Oronite Chemical Co., 200 Bush St., San Francisco, California.)

Check 3996 opposite last page.

Pump sleeve wear is reduced

Problem: Sleeve of an extract phenol pump, in large southwestern refinery, exhibited excessive wearing.

Solution: Sleeve was overlaid with powder of nickel-base hard-surfacing alloy, incorporating chromium borides.

Results: In same service, sleeve lasted seven months. Inspection of sleeve revealed uneven wear pattern, due to pump-shaft eccentricity. However, joint had not been leaking.

(Alloy Powder 6 is product of Wall Colmonoy Corporation, 19345 John R. St., Detroit 3, Michigan.)

Check 3997 opposite last page.

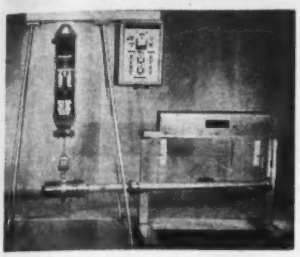
Control of stresses furnished by pipe hanger

Uses: Application in high-temperature pipe connections between superheater or reheat headers and turbines, requiring limited-stress reactions at terminal connections.

Features: Hanger permits control of end reactions, permitting concentration on flexural stresses in line itself. Also, heater-connection flexibility can be fully utilized by applying positive outside forces to headers in order to make them move into positions which will minimize stresses

within pipe systems.

Description: In power-activated pipe hangers, power to move loads to optimum positions is fed into wires to re-



Power-activated pipe hanger

versible fractional-hp motor. It is then multiplied through high-ratio reduction gears. These operate ball-bearing jack mounted within hanger frame.

(Stress-trol is product of Grinnell Company, Inc., Providence 1, R.I.)

Check 3998 opposite last page.

Gas-treating processes offer low investment, operating costs

Non-corrosive solutions used, cutting plant cost

European gas-treating processes which permit removal of hydrogen sulfide and carbon dioxide from industrial gases with lower investment and operating costs are being made available to U.S. manufacturers.

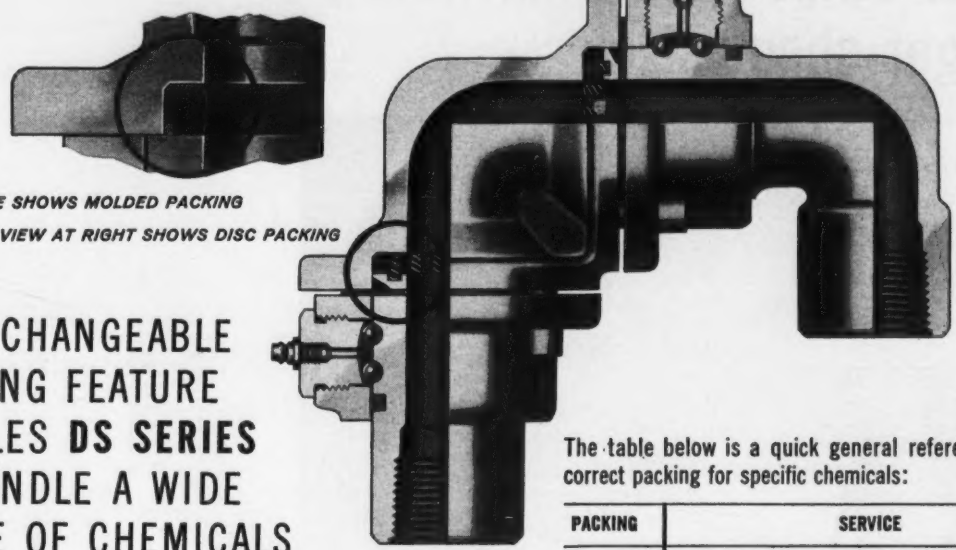
Applicable in the treating of natural, refinery, coke-oven, and petrochemical synthesis gases, the processes feature high rates of absorption and desorption of acid gases.

Solutions are non-corrosive, permitting use of low-cost carbon-steel equipment and piping. Steam consumption is low compared to conventional processes.

(Further information on gas-treating plants utilizing Giammarco-Vetrocoke processes may be obtained from licensee, The Fluor Corporation, Ltd., 2500 S. Atlantic Blvd., Los Angeles 22, Calif.)

Check 3999 opposite last page.

NEW CHIKSAN SWIVEL JOINT
GIVES SAFE, LASTING FLEXIBILITY TO CHEMICAL SERVICE LINES



VIEW ABOVE SHOWS MOLDED PACKING

VIEW AT RIGHT SHOWS DISC PACKING

INTERCHANGEABLE PACKING FEATURE ENABLES **DS SERIES** TO HANDLE A WIDE RANGE OF CHEMICALS IN SERVICES FROM –65°F TO +400°F AT 300 PSI

The DS Series swivel joint with its broad service range can be a valuable new tool in your process system. Use it in chemical loading of tank car or tank truck, for stress relief in piping subjected to vibration, expansion or settling, or as a steam rotation connection between stationary and revolving equipment. Wherever you use it, you'll find it pays for itself in extended service life.

Using a disc or molded type packing, this swivel joint can be applied to handle steam and any of a wide variety of chemicals processed in your plant. And the split segment feature of the DS Swivel Joint allows replacement of packings without removing the joint from the line.

Buy and apply Chiksan DS Series Swivel Joints for chemical service lines in your plant now. You can select from eight basic styles for full rotation in one, two or three planes. For more information write to Chiksan or fill in the coupon below.

The table below is a quick general reference for the correct packing for specific chemicals:

PACKING	SERVICE
Neoprene	Recommended for alkaline and acid salt solutions and aldehydes such as formaldehyde.
Hycar	These should be used for petroleum derivatives, neutral or slightly acidic salt solutions, dilute acids (Sulfuric to 50%, Hydrochloric and Nitric to 20%), alcohols, glycols, ethers, gases (Oxygen not over 500 psi), and vegetable oils.
Butyl	Recommended for liquid or anhydrous ammonia, gases (except oxygen over 500 psi), ammonia derivatives such as hydrazine and for certain hydraulic fluids such as Pydraul, Skydrol, and Cellulube. It is recommended for acetone and methyl ethyl ketone.
Teflon*	Used for concentrated or fuming acids and other highly oxidizing fluids, esters, aromatics, liquid chlorine, bromine and fluorine if temperature is not excessive.
Asbestos	For use in saturated steam service.
Viton "A"*	Recommended for use with concentrated acids, aromatics, liquid chlorine, liquid bromine, chlorine or bromine derivatives, molten sulfur, and carbon disulfide.
Metallic	For extreme services such as hot gas at 600°F., a Stainless Steel metal disc, specially treated to prevent galling, is recommended.

* R.T.M. DU PONT

CHIKSAN COMPANY, 330 North Pomona Ave., Brea, California

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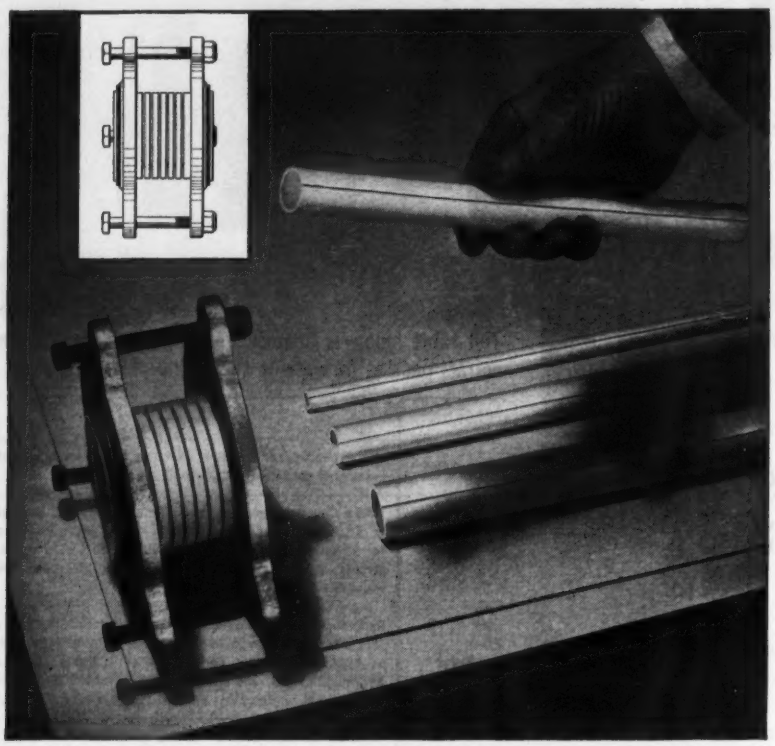
Check 4000 opposite last page.

TEFLON* NEWS FROM R/M

- New expansion joint
- Color-striped thin-wall tubing
- Larger sheet sizes



New expansion joint and color striping on thin-wall tubing are part of R/M's comprehensive line of tubes, rods, sheets, tape and bondable "Teflon."

Raybestos-Manhattan announces three important additions to the broadest array of "Teflon" products available to the chemical industry: a new "Teflon" expansion joint featuring square convolutions for additional strength in flexure; "Teflon" thin-wall tubing with color striping to permit ready identification of individual tubes, and 1/32-in.-thick "Teflon" in new 36 x 36 in. sheets. Other thicknesses available in sheets up to 48 x 48 in.

R/M also offers ample facilities for extruding, molding and machining "Teflon" to your exact specifications. In fact, whenever you look to "Teflon" to solve a problem, depend upon R/M to meet your needs. Consult your nearest R/M district office for courteous, competent assistance. For literature, write Plastic Products Division, Manheim, Pa.

*A Du Pont trademark

R/M

RAYBESTOS-MANHATTAN, INC.

PLASTIC PRODUCTS DIVISION FACTORIES: MANHEIM, PA.; PARAMOUNT, CALIF.

Contact your nearest R/M district office listed below for more information or write to Plastic Products Division, Raybestos-Manhattan, Inc., Manheim, Pa.

BIRMINGHAM 1 • CHICAGO 31 • CLEVELAND 16 • DALLAS 26 • DENVER 16 • DETROIT 2 • HOUSTON 1
LOS ANGELES 58 • MINNEAPOLIS 16 • NEW ORLEANS 17 • PASSAIC • PHILADELPHIA 3
PITTSBURGH 22 • SAN FRANCISCO 5 • SEATTLE 4 • PETERBOROUGH, ONTARIO, CANADA

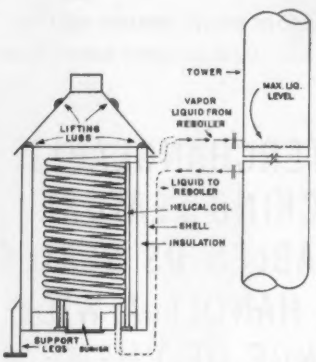
RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber Sintered Metal Products • Rubber Covered Equipment • Abrasive and Diamond Wheels • Brake Linings Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

Check 4001 opposite last page.

Fractionator reboilers serve 17 months without failure

Hot-oil circulating pumps are eliminated

Direct-fired fractionator reboiler, for a stabilizer in hydrocarbon-recovery system has been in operation since February 1958 without a shutdown-causing malfunction, for Pan American Petroleum Corporation at their Antioch Facilities Plant near Shreveport, Louisiana. Plant is attended only eight hr/day.



Hydrocarbon-recovery system is provided by direct-fired fractionator reboiler for stabilizer

Hot-oil circulating pumps are not necessary. During performance tests on Antioch plant, stabilizer processed liquid at rate of 1475 bbl/day of 12-lb RVP distillate. During tests, operating conditions for reboiler were:

Temperature, °F:	
Inlet	429
Outlet	453
Pressure, psig	300
Fuel-consumption rate, Btu/hr	2,550,000

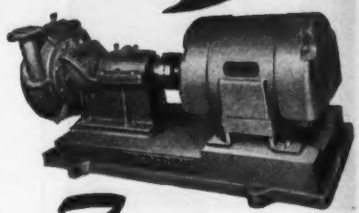
Design data for installation is as follows:

Fluid, stabilizer bottom:	
Liquid in, lb/hr	40,433
Liquid out, lb/hr	31,287
Vapor out, lb/hr	9,146
Heat absorption, Btu/hr	3,360,000

(Russco Thermosiphon heaters are a product of the Russell Engineering Corporation, 2609 Sunset Boulevard, Post Office Box 6731, Houston 5, Texas.)

Check 4002 opposite last page.

Custom-built for EFFICIENT DEPENDABLE SERVICE



Frederick

SSV PUMPS

Enclosed Impeller and Open Impeller Types

You're sure of maximum service and output with minimum maintenance or production down time with Frederick SSV Centrifugal Pumps because each pump is custom-made to fit your particular operation—whatever the consistency or type of liquid you're moving.

SSV PUMP FEATURES

- **Pump sizes from 1" to 4" discharge openings.**
- **Pump capacities from 50 up to 700 U.S. GPM.**
- **Heads from 30 up to 220 feet.**
- **Pumps speeds can be varied to suit the driving media and operating conditions.**

CONSTRUCTION ADVANTAGES

Pump casings are vertically split for easy accessibility. Mounted on a swivel to permit placing discharge in any desirable position. Pump openings, both suction and discharge, flanged to permit easier connection and disconnecting to joints. One-piece impellers, securely attached to shaft by stout key and lock nut, or threaded, give long service. Pump bearings mounted in sturdy frame horizontally split for easier accessibility. Extra long stuffing box provides for oversize stuffing. Mechanical seal also available for minimum leakage. Pump coupling flexible for direct connection to drivers or can be arranged for belt drive. Pump speed, pump openings, etc. are selected to suit your particular requirements.

Write for Bulletin No. 107

FREDERICK PUMPS

FREDERICK IRON AND STEEL, INC.
FREDERICK Est 1890 MARYLAND

Check 4003 opposite last page.

THAT'S INTERESTING

fiery titanium

Scientists at Oak Ridge National Laboratory have discovered that under certain conditions titanium can ignite and burn rapidly. *Research for Industry,* published by Stanford Research Institute, reports that a team of three men found that, depending on the pressure and oxygen concentration, solid pieces of titanium would ignite and oxidize rapidly. The factor necessary to cause this is the exposure of a fresh, uncoated surface of the metal to oxygen—such as when a solid piece of titanium is ruptured. Once oxidation has started, it continues in atmospheres with much lower oxygen levels than are needed to initiate it.

Lighting the way

From Holland comes a report the Borst Metal Factory of Apeldoorn has designed a plastic head lamp that weighs only 2¾ oz. It is said to be especially useful for bandsmen, campers, motor rally participants—or just to read in bed.

One slip can cost more than USS Multigrip...

What percentage of occupational accidents is caused by falls? In one state, falls were responsible for 17 per cent of all injuries, 33 per cent of the days lost and 23 per cent of the direct cost. (From National Safety News, February, 1959.) Falls ranked No. 1 as the cause of most accidents.

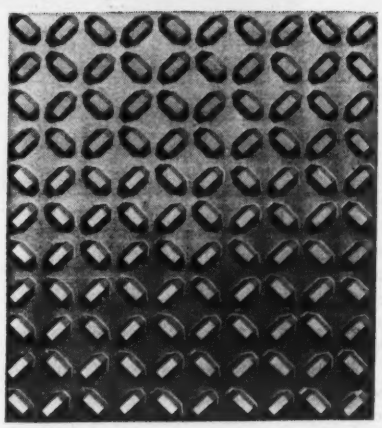
Fortunately, you can do something to prevent falls by installing USS Multigrip. Multigrip floor plate provides safe traction in any direction. It is studded with little cleats that are flat on top and do not catch the shoe.

For dangerous locations such as machine shops, loading platforms, stair treads and catwalks, USS Multigrip supplies safety plus.

Saves money, too! Where floors take a pounding from heavy traffic, Multigrip will stand for years under constant use. There's little or no maintenance.

On your next inspection trip, search out the hazardous locations—and make them safe with USS Multigrip.

USS is a registered trademark



Sold by leading distributors from coast to coast.

United States Steel Corporation—Pittsburgh
Tennessee Coal & Iron—Fairfield, Alabama
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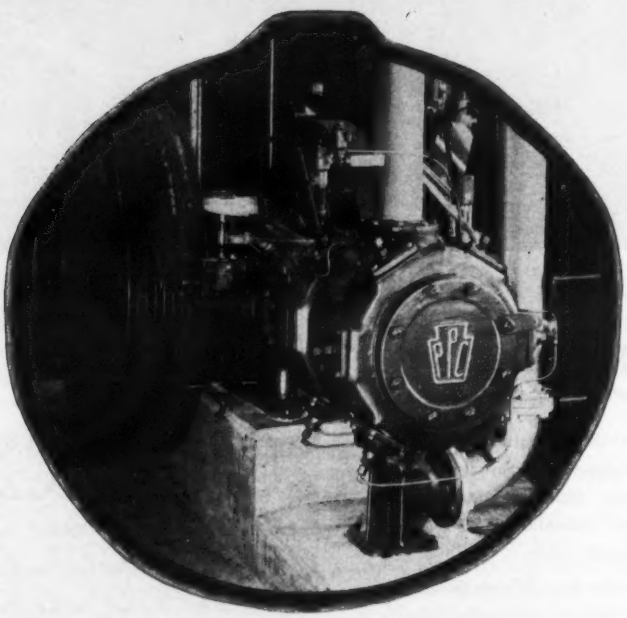
United States Steel

*with this valve
COMPRESSOR RUNS DAY AND NIGHT FOR 20 YEARS



Unusual? Yes, when you are not *getting* performance like this. No, when you have a Pennsylvania Compressor on the job. Long, long service without downtime is standard operating procedure with every Pennsylvania Compressor.

*Reason: the Pennsylvania Air Cushion Valve, constructed without nuts, bolts or screws. Stainless steel valve discs lift against a soft cushion of air; there is no flexing or bending action to weaken them. They will remain perfectly seated over long periods of service.

The compressor above delivered over 20 years of continuous performance . . . three days were lost once when it was moved, but that's all. Isn't it time you were on the receiving end of this kind of sure, sustained performance? Write today for your free copy of "Compressors for Industry" which describes Pennsylvania Compressors from 10 to 350 hp.

PENNSYLVANIA PUMP AND COMPRESSOR CO.
Easton, Pa. Earning Customer Confidence Since 1920

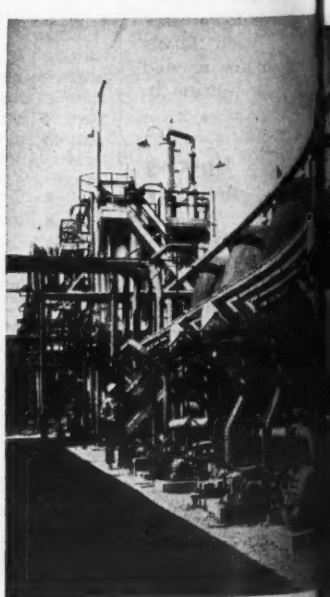
Check 4004 opposite last page.

Hissing and fuming box-like pumps previously used were inefficient. Note leakage of wax from pump at lower left

Steam-jacketed centrifugal pumps move liquid wax without leakage

Former reciprocating, box-like steam pumps used for handling liquid wax hissed and leaked

G. L. MEYERS, Assistant Superintendent
Bareco Wax Company, Div. of Petrolite Corp.
Barnsdall, Oklahoma
with **CP Staff**



Problem: Wax leakage around shaft occurred with previous pumps used for transferring liquid microcrystalline wax at Bareco Wax Company, Division of Petrolite Corporation, Barnsdall, Oklahoma. These box-like, reciprocating units caused loss of product and required excessive maintenance.

Solution: As a replacement for the older, outdated pumps and in new installations, refinery placed 44 horizontal centrifugal pumps in operation.

The centrifugal pumps are equipped with mechanical seals, which prevent leakage of product being handled. They have steam-jacketed heads to maintain wax above 200°F to keep it in liquid form so it can

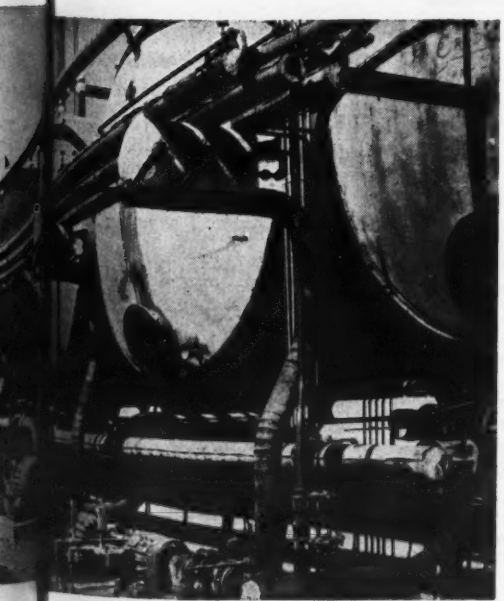
Steam-jacketed centrifugal pump used now is a neat and orderly installation

be pumped. Standardization of parts provides a large degree of interchangeability of parts within three or four pump sizes.

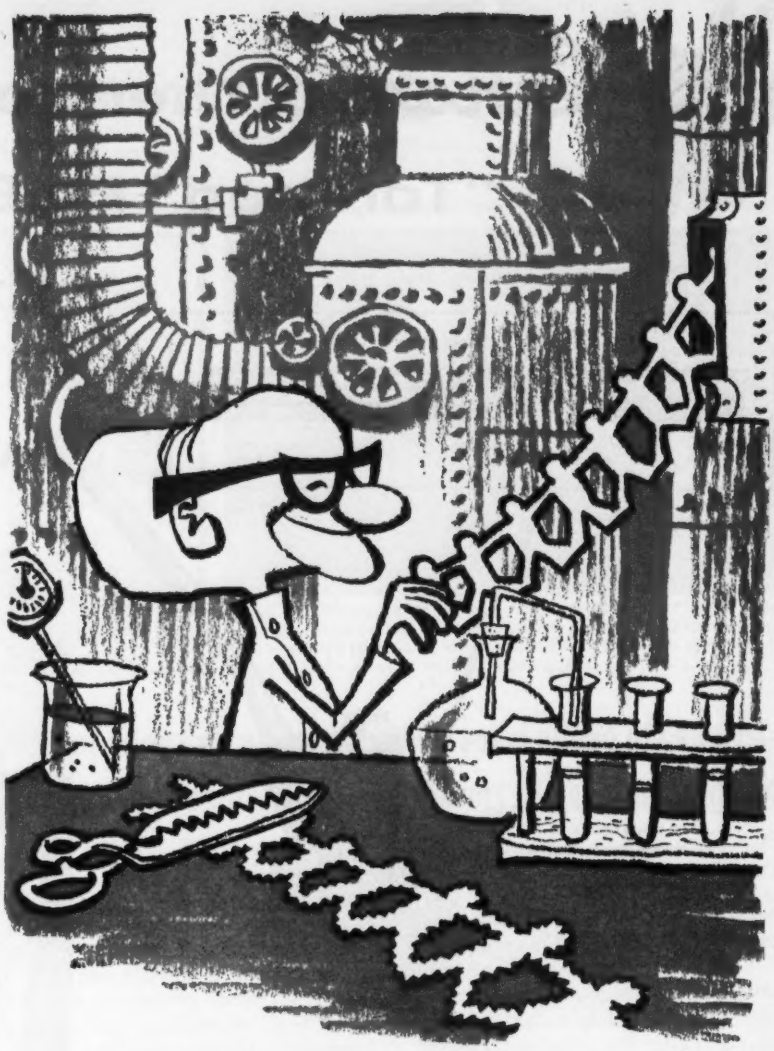
Results: Steam-jacketed centrifugal pumps have given excellent service at Bareco Wax. Leakage has been eliminated and installation is a neat and orderly one. Only a minimum of maintenance has been necessary. Steam-jacketing keeps wax being pumped at 200-230°F. Ability of pumps to produce a normal flow is aided by addition of heat in steam jacket. Efficiency of units helps plants produce a high-quality product.

(Type DZT horizontal centrifugal pumps are product of The La Bour Company, Inc., Elkhart, Ind.)

Check 4005 opposite last page.



Eight of the centrifugal pumps mounted at base of storage tanks at Bareco Wax



The man who knows his process equipment . . . chooses G-B Evaporators!

To guarantee results such as Doctor Hector's equipment produces is just a little out of our line, but you will find G-B Evaporators in many of America's major paper processing industries.

Men who know their process equipment in the paper, aluminum, sugar and other chemical fields have been specifying G-B Evaporators since 1879.

It would make us very happy to fill your request for facts, figures and case histories of experts who have chosen G-B equipment. All we need is your name and address. Please send.

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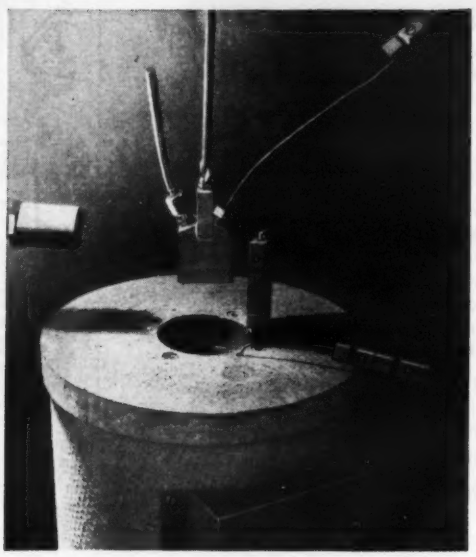
Check 4006 opposite last page.

Ceramo® Thermocouples "Tortured" By Exotic Fuel Explosions At Air Reduction Co.

Metal "bomb" designed by Airco for testing liquid fuels showing "Ceramo-Couple" and gas escape line.



Airco furnace containing molten metal—with test "bomb" ready for immersion.

When Thermo Electric designed "Ceramo" for extra-tough thermocouple applications, even "Ceramo's" designers did not figure on the "torture test" devised for it by Air Reduction Co. High temperatures, extreme corrosion, high pressure, great durability, easier installation—all these conditions "Ceramo" takes in stride with typical versatility. But ability to withstand actual explosions—well, that was a lot to ask. "Ceramo," however, did just that.

Airco needed such a thermocouple to test thermal stability of rocket and jet engine liquid propellants at their Murray Hill, N. J., laboratories. The fuel is placed in a small metal vessel which is then immersed in molten metal. One opening of the vessel is sealed with a small rupture disc. In the other opening a thermocouple is fitted to measure the reaction rate of the fuel over a wide range of temperatures before explosion occurs. Naturally, the thermocouple must withstand the explosion. "Ceramo-Couples" withstand 10 or more such explosions before replacement. This "torture test" is endured by enclosed junction "Ceramo-Couples" of but 1/16" o.d. with 30 gage conductors. This test method would not be feasible without thermocouples of such small diameters.

Other "Ceramo" features essential to this job include accuracy—to indicate exact temperatures; sensitivity—to indicate temperature changes quickly; and corrosion resistance—these exotic fuels are highly corrosive.

"Ceramo" could well be the answer to your thermocouple problems—mechanical, thermal or chemical. Find out by contacting Thermo Electric today.

Write For Bulletin 325-R

Thermo Electric CO., INC.
SADDLE BROOK, NEW JERSEY
In Canada: THERMO ELECTRIC (Canada) LTD., Brampton, Ontario

Check 4007 opposite last page.

Humble Oil & Refining to utilize computer

An analog computer will soon be placed in use at Humble Oil & Refining Company's big Texas refinery. Unit will be utilized as master computer in research and development work on new processes, optimization of existing refinery operating units, and to speed-up and improve processes and mechanical design in all phases of company's operations.

Precision repetitive operation at 50 solutions/sec permits processing engineers to vary equation coefficients and observe resultant effects continuously on 17" oscilloscope. Computer also incorporates dynamic memory, generation of function of two variables, dynamic function generation, and high-frequency performance not previously available.

Computer performance is equipped with 202 operational amplifiers, 60 electronic multipliers, and 20 ten-segment diode function generators as basic computing elements. Facility may be expanded to twice this size.

(Analog computer MC-5900 is product of Computer Systems, Inc., a Subsidiary of Schlumberger, 611 Broadway, New York 12, N.Y.)

Check 4008 opposite last page.

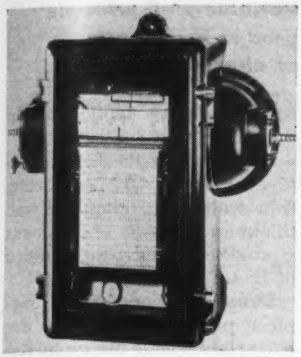
Combustible-gas density continuously measured and recorded

Power supply not needed for recorder

Uses: Continuous recording of absolute gas density in petrochemical, organic chemical, power, and gas-production industries.

Features: Recorder operates mechanically and needs no power supply for its drive. Explosion-proof construction of apparatus permits measurement of combustible gases and/or installation in hazardous areas.

Description: Gas-density recorder operates on buoyancy principle. Lifting force of dis-



Gas-density recorder design permits installation in hazardous areas

placement element, dependent on gas density, is measured. Balance deflection is transmitted, by means of magnetic coupling, from gas chamber to indicating and recording appliance.

(Pollux gas-density recorder is product of Air Conditioning Equipment Corp., 221 E. 44th St., New York 17, N.Y.)

Check 4009 opposite last page.

Quick analyzer response to end-point variation

Uses: Continuous analysis of petroleum products, where end boiling point is important to quality and yield.

Features: Analyzer responds immediately to any variation in end boiling point of sample.

Description: End-point analyzer consists of four main components. These are boiling pot with constant heat input, fractionating tower packed with Berl saddles, pneumatic pressure-control system, and temperature-sensing unit.

Analyzer performs right at operating unit. It continuously and automatically indicates Engler end boiling point of hydrocarbon stock or commodity, with end-point range of 200 to 600°F. Reproducibility delivered is within ±1°F. Results correlate with ASTM D-158 or ASTM D-86.

(Totco end-point analyzers are product of Technical Oil Tool Corporation, 1057 N. La Brea Ave., Los Angeles 38, California.)

Check 4010 opposite last page.

COOPER ALLOY VALVE BRIEFS

THE VALVE AND FITTINGS ANSWER CORNER

Send in your questions on stainless valves and fittings to Carl Tylka, Cooper Alloy Technical Service Director.

Q. *Is it possible to obtain a valve which, like a globe valve, possesses linear throttling characteristics, but which also, like a gate valve, has low fluid pressure drop across it when fully opened?*

A. Not throughout the entire flow range of the size valve being considered. A very close approximation, however, may be attained with a Flex-Plug type design (a unique new valve patented by Cooper Alloy), which provides linear throttling response up to 90% of full valve flow. The 10% balance of the upper flow region would exhibit a typical gate valve flow pattern.

Q. *How can one prevent oxidation of active ferrite ion on the fluid side of a cast stainless valve body?*

A. This type of corrosion is commonly found on untreated cast stainless surfaces only, and may be caused by foundry, machinery, and handling techniques. Proper pickling and passivation with thorough mechanical cleaning will generally rectify this, though in some cases actual weld repair of the contaminated surface is required. Since this is a surface condition only, machining or grinding will also help.

Q. *What type of valve do you recommend for manual-control services where minimum pressure drop is required?*

A. In the absence of more detailed knowledge of the problem, I would tentatively recommend an angle valve. The pressure-drop characteristics of this type valve are less than 50% those of conventional globe valves.

Q. *Is it advisable to specify installed valve position on an order?*

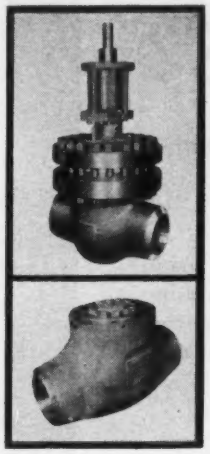
A. Definitely. By inclusion of this information, definite design considerations can be incorporated, especially in cases where backseat leakages are critical and mechanical valve operation is involved.

Q. *Is it advisable to install valves smaller than the accompanying pipe sizes?*

A. Where flow and pressure considerations so permit, it is not only advisable but also economically beneficial.

Q. *Why aren't valve bodies with butt weld and connections made shorter?*

A. To prevent distortion of the seating surfaces during installation. The longer length is required for heat dissipation during welding.



Above left, Cooper Alloy 16" cast stainless gate valve ready to receive gear motor drive; lower left, Cooper Alloy 12" cast check valve. Both are rated for 2500 psi service at 670°F. Official AEC photo above shows them in place in nuclear process line.

Cooper Alloy cast stainless valves spurt ahead of competition to win acceptance in AEC's Spert III reactor program

Cast yield strengths of 23,000 psi, plus cost savings of 40%, do the trick!

This is a Cooper Alloy success story in another "first": casting of stainless valves and fittings to strength levels actually surpassing those previously possible only in forgings—and doing it all at a 40% saving to the customer!

The story starts, naturally, with the AEC's valve and fitting specifications, which are rugged indeed. They have to be certified to function continually at elevated pressures and temperatures (2500 psi, 670° F.), under which conditions leakage, corrosion, and other operational problems are magnified enormously over those encountered in normal process work.

Prior to turning to Cooper Alloy, the contractor for the AEC cancelled a large valve order from another supplier, because the latter could not meet the exacting physical specs without changing the material specs. Cooper Alloy was given the order on the basis of producing to meet AE and AEC specs. Cooper Alloy valves and fittings are currently in operation in the AEC's Spert III installation at Arco, Idaho. Included are nuclear fittings, and motor and manual operated gate, globe, and check valves in various sizes.

How does Cooper Alloy do it? Through the use of the most advanced foundry methods, meticulous attention to conditions, and an exact balance of chemical composition to develop the maximum strength characteristics inherent in the complex structure of stainless alloys. All products, naturally, are elaborately tested and guaranteed before delivery.

As if the AEC's specs were not stringent enough, there is now a bonus to the story: during production, Cooper Alloy technicians worked out ways of producing cast strengths higher than those required, and proceeded to produce all fittings and valves to these higher, self-imposed standards—at cost savings of 40% over forged valves and fittings!

Unusual, yes, but not to Cooper Alloy. It's typical of the quality bonus you get when you buy from Cooper Alloy. For further information, write to Cooper Alloy Corporation, Hillside, N. J.

Check 4011 opposite last page.

WANT TO PUMP ANY OF THESE PROBLEM FLUIDS?

Chempump, the original "canned" pump, handles them all easily.

If you've got a problem handling volatile, toxic, explosive or other "tough" fluids, Chempump is your answer. This process-proved, maintenance-free pump can handle the tough ones with absolutely no leakage or contamination. Units available for system pressures to 5,000 psi . . . temperatures to 1,000 F. . . . capacities to 600 gpm.

Here's a pump that is built to a design evolved from years of experience in the "canned" pump field . . . many more years than any other manufacturer of similar pumps.

Only Chempump offers you proved operating performance . . . from thousands of installations in all types of services . . . plus experienced field sales engineering. Use Chempump to solve your fluid pumping problems. Write now . . . for "request for quote" data sheet . . . to Chempump Division, Fostoria Corporation, Buck and County Line Roads, Huntingdon Valley, Pa.

Acetic acid
Chlorine
Acrylonitrile
Phenol
Dowtherm
Diethanolamine
Dimethyl sulfate
Heavy water
Cyanides (toxic)
Nitric acid
Sulphite liquors
Titanium tetrachloride
Nitrogen tetroxide
Hydrazine
Formaldehyde
Boron fuels
Sodium hydroxide (less than 50%)
Toluene diisocyanate
Methyl chloride
Mercaptans
Ethylene oxide

Chempump combines pump and motor in a single, leakproof unit.
No seals, no stuffing box.
Most models U. L. approved.

Chempump

Finest in the field...process proved

Check 4012 opposite last page.

PETROCHEMICALS

Variable-wall principle used to lower costs of aluminum pipe

Uses: Piping applications in the petroleum industry.

Features: Costs of aluminum pipe lowered by combining thin walls with standard wall thickness at pipe ends. Joints strengthened by concentration of metal at ends.

Description: Seamless, one-piece pipe is 40% lighter due to variable-wall principle. Ratio of thick to thin walls is selected to provide uniform bursting, tension, and bending strength along pipe's length after welding.

It is currently available in 40′ lengths in alloys 6061-T6 and 6063-T6 with schedule 40 wall thickness at ends. Accepts standard aluminum fittings and flanges.

Additional combinations of wall thicknesses can be produced for other joining methods.

(Unistrength pipe is development of Aluminum Company of America, 1501 Alcoa Building, Pittsburgh 19, Pa.)

Check 4013 opposite last page.

Meter tubes for measurement and control of liquids and gases are discussed in detail in 20-page handbook. Design and engineering information is included. Cat Sec D — Daniel Orifice Fitting Co., PO Box 19097, Houston 24, Texas.

Check 4014 opposite last page.

Electronic air cleaner operation details, agglomerator explanation, capacity and dimension tables, and specifications are included in 16-page Bul 249-A—American Air Filter Company, Inc., 215 Central Ave., Louisville 8, Ky.

Check 4015 opposite last page.

Butterfly valves, known as Wafer valves, are described in 10-page catalog. Units discussed have removable and interchangeable rubber and metal seals in a variety of materials designed to withstand acids and alkalis. Angle seat design provides full circle seat. Disc does not seat in shaft hole. This provides a 360° unbroken seating surface. "Norriseal Wafer Valves" — W. C. Norris, Manufacturer, Div. of Dover Corporation, Tulsa, Okla.

Check 4016 opposite last page.

Bag-weight variation checkmated

. . . in continuous automatic checkweighing operation which saves $10,000/year

Problem: High incidence of bag over-filling, excessive tie-up of manpower, and costly production delays were factors of inadequacy in hand-weighing system used to arbitrarily spot-check bag weights of dry-starch products at A. E. Staley Manufacturing Company, Decatur, Illinois.

Solution: An automatic checkweighing system was installed to provide continuous automatic weighing and off-weight indication. Checkweigher-unit components consist of scale-base and lever system, short-beam cabinet and motorized conveyor belt. Remote sections of system include pilot-light station, digital-counter unit, and wall-mounted control station.

Prior to bagging operation, weighing unit is adjusted (within range of 25 to 140 lb at Staley) to meet packaging requirements of bags to be filled. This involves setting poises on calibrated beams inside enclosure on back of cabinet. When production-control requirements are changed, single weight-tolerance control is adjusted at wall-mounted control cabinet. Accepted variance at Staley is ±2 oz, but unit is capable of adjustment to ±1 oz tolerance.

After bags are packed by filling machine, they are conveyed to checkweigher at 15-bag/minute rate. Weight is automatically taken while bag is in motion. Conveyor system then transports bags to be either palletized and warehoused or to car-loading area.

Deviation of bag weight from norm is indicated by vertical row of five pilot lights mounted on panel above bagging-unit operator. At beginning of any given operation, before filling unit has been accurately adjusted, bag weights may exhibit considerable deviation. Bags, so indicated to have weights outside of acceptable range, are removed from line and dumped manually.

Signal System

Following this initial adjustment period extreme-deviation-incidence rate is virtually non-existent. Bag-weight trends away from norm may occur because of product-density variation, head-pressure changes in supply bins or dust build-up on packers. Operator adjusts filling mechanism to compensate for deviation.

Checkweight signal of each item is regularly activated by three-way adjustable limit-switch mounted on conveyor. This actuates electronic weight sensor. Sensor in turn transmits zone-classification signal to control station. Signal is also transmitted to remote counter station containing five key-reset-type magnetic counters. These provide accurate tabulation of entire production run, broken down into the five zone classifications.

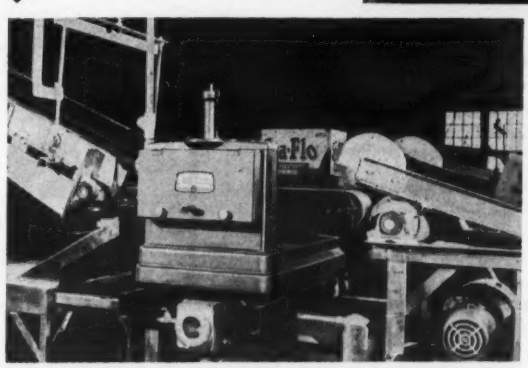
Unit has accuracy of greater than 1 part in 3000. This is represented by overall zone-edge tolerance of better than 1/3 oz for 3σ.

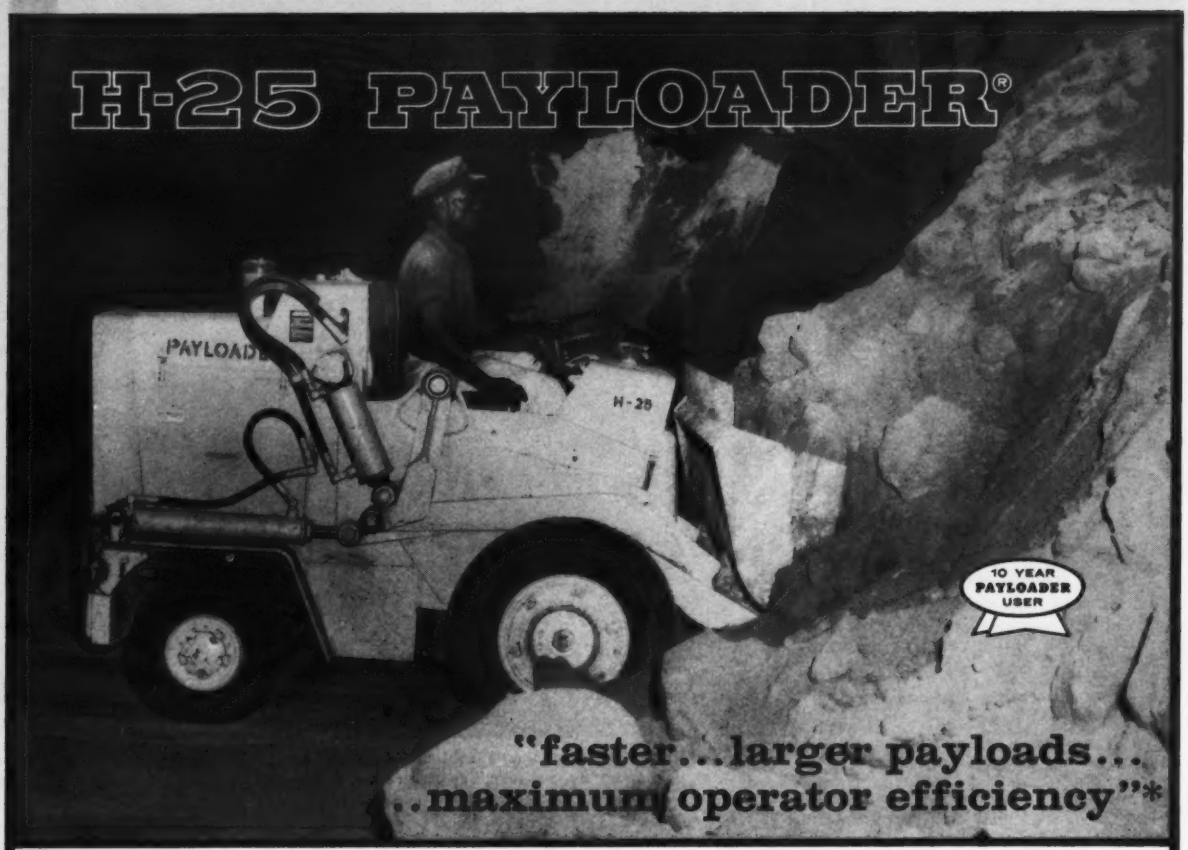
Mechanical and plug-in electronic components are completely standardized. Locked beam enclosure precludes tampering. Zero-setting meter

▲Utilization of automatic continuous checkweighing system has eased manpower requirements by one man/day and reduced over-filling costs. Checkweigher unit is at middle-left of photo

Pilot-light panel mounted in front of bagging-unit operator provides running indication of bag-weight trend. Lights flash on to signal that bag-weight deviation from norm, from top to bottom in ounces, is (1) + 6 or more (OVER), (2) + 2 to + 6 (OK-HEAVY), (3) −2 to +2 (OK), (4) −2 to −6 (OK-LIGHT), or (5) −6 or less (UNDER) ▼

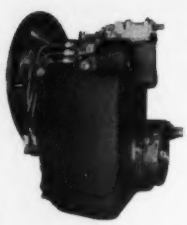
In addition to bags, unit handles cartons. With cases of bottles, system provides indication of missing containers. Checkweigher can handle items in 25- to 250-lb weight range at rate of up to 40 items/min ▼





Exclusive..

Complete power-shift transmission



. . . the only tractor-shovel in its size range with full power-shift transmission having two speeds forward and two reverse . . . the low range for digging power and close maneuvering . . . the high range for fast, economical travel in either direction.

*"We have been using 'PAYLOADER' units for some 10 years with very satisfactory service. Our latest, the H-25, is doing an all-around better production job. It is faster, carries larger payloads and we get maximum operator efficiency because of less operator fatigue", says J. E. Dorland, Mgr. McMillan & Harrison Fertilizer Co., Mobile, Ala.

BUILT-IN MANEUVERABILITY AND SPEED

The Model H-25 with 2500 lb. carry capacity, only 6 ft. turning radius, power-shift and easy power-steering is the most concentrated package of tractor-shovel ever designed. "No-spin" differential and 4500 lbs. of bucket breakout force are two other reasons for the outstanding traction and digging power of this superior tractor-shovel.

LOWER MAINTENANCE — LONGER LIFE

The boom and bucket mechanism is rugged and simple with fewer parts and linkages and with anti-friction bearings at critical pivot points. Triple air cleaning for the engine, cartridge-type filters on all three oil systems, self-adjusting sealed hydraulic brakes and special grease and oil seals at all pivots and ball joints all contribute to long life and low maintenance.

Ask your Hough Distributor to prove the H-25 on your work. Ask him, too, about larger models in the "PAYLOADER" line.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

_____ Send H-25 "PAYLOADER" data
_____ Information on other "PAYLOADER" models

Name _____
Title _____
Company _____
Street _____
City _____ State _____

9-A-1

Check 4017 opposite last page.

mounted on cabinet gives visual indication of accurate setting.

Results: The 100% continuous weight-check provided by system has reduced costs approximately $10,000/year. This is due to reduction of bag-over-filling rate, freeing of one man/day for other work, and elimination of production delays. Also, improved control method assures customers of correct bag weights.

(Automatic Checkweigher 9460 is product of Toledo Scale, Division of Toledo Scale Corporation, Toledo 12, Ohio.)

Check 4018 opposite last page.

Tote-bin tilter designed for non-contamination

Uses: Tilt for emptying Tote bins.

Features: Aluminum stationary hopper and stainless-steel screw flight make unit suitable for products that must not be contaminated.

Description: Tilt consists of the hopper and screw flight mounted on dormant-type Howe scale, complete with air cylinder, pipestand, and motor drive. Air cylinder elevates bin to make contact with gasketed dust-tight hopper.

(Tote Tilt is development of Tote System, Inc., Beatrice, Nebraska.)

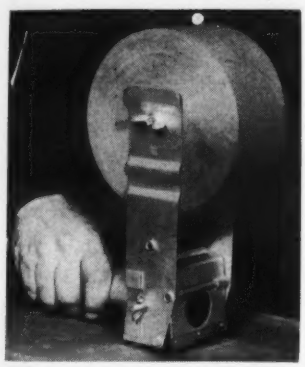
Check 4019 opposite last page.

Seal cartons anywhere with portable unit

Uses: For sealing cartons on the spot, as pull-tear stationary dispenser, affixing labels.

Features: Portable (1½-lb) gummed-tape dispenser may be used anywhere for sealing all types of cartons. With base which has own cutoff blade, it serves as stationary unit. Removable reservoir-handle useful for wetting box areas to affix labels.

Description: Water held in



Combination portable-stationary gummed-tape dispenser seals packages on the spot or can be used on bench

handle is dispensed through dual nozzle, wetting sponge evenly. Button-type valve enables operator to use wetter than normal tape if desired. Spacers furnished for 2½" and 2" widths of tape. Combination cutoff and tape-locking blade grips tape if handle is raised from near-horizontal position; twist cuts tape.

(Port-O-Seal dispenser is manufactured by Port-O-Seal Sealer Division of A.W. Chaffee Corporation, PO Box 134, South Pasadena, Calif.)

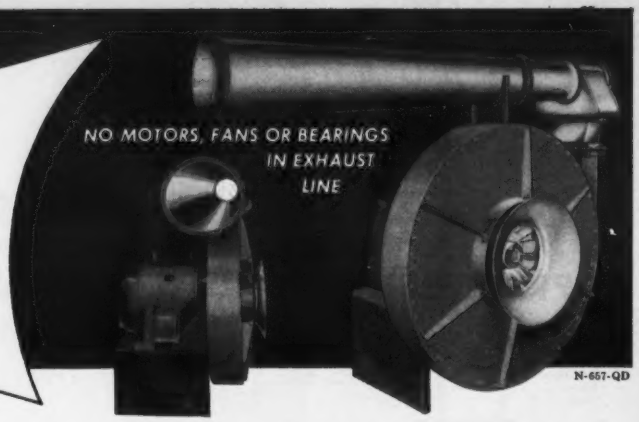
Check 4020 opposite last page.

Plastic bottles—Markets, advantages, and container designs are discussed and illustrated in 12-page booklet. It points out that high-density polyethylene and isotactic polypropylene show great promise of expanding the field of plastic packaging. "The Plastic Bottle Comes Of Age"—Hercules Powder Company, Inc., Wilmington 99, Del.

Check 4021 opposite last page.

Now . . .

you can reduce bulk materials handling costs with *Quickdraft* high pressure exhausters



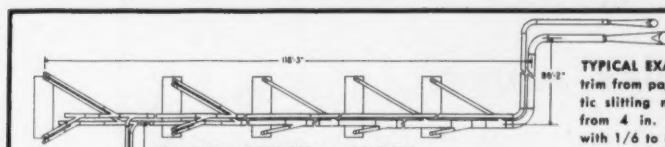
FOR MOVING:

Cement, Sand, Iron Oxide, Wheat, Corn, Salt, Limestone, Castor Beans, Knots, Blocks, Paper, Wool, Cotton, Oats, Rags, Rubber, Vegetables, Coal (Powdered), Shavings, Cork, Sawdust . . . **and any other materials that can be moved by air!**

IMPORTANT NOTICE

For resisting abrasive action, Quickdraft units can be rubber lined. For withstanding corrosive gases, all Quickdraft units are available in standard acid resisting vitreous enamel, No. 316 Stainless Steel, rigid plastics (PVC), and with plastic and Fiberglas coatings.

Time and maintenance savings usually pay for Quickdraft high-pressure exhausters in 6 to 18 months on materials handling jobs. Because material does not pass through blower, maintenance is negligible. Downtime for cleaning and replacing fans, motors and bearings is eliminated. Quickdraft units are also ideal for exhausting paint spray, abrasives, corrosive gases, noxious fumes and high temperatures. For Quickdraft engineering data on materials handling, industrial exhausting, heating plant venting, write today!



Patent Nos. 2,722,372 and 2,855,874. Other Patents Pending. Covered By Exclusive Foreign Patents.

TYPICAL EXAMPLE: Ideal for moving trim from paper, cellophane and plastic slitting machines. (Models range from 4 in. to 30 in. diameter — with 1/6 to 600 H.P. motors — with negative static pressures from 1/4 in. to 60 in. W.G.)

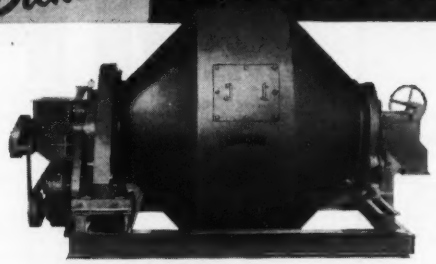
Quickdraft corporation

Well known for power draft units for all types of heating plants.

P.O. Box 87-Q • Canton 1, Ohio

Check 4022 opposite last page.

Evenly Blended but no reduction in particle size



THE MUNSON ROTARY BATCH MIXER blends every ingredient evenly, without stratification and without reduction of particle size. Handles any mixture of dry ingredients, with capacities ranging from 5 cu. ft. to 360 cu. ft. Intake and discharge at opposite ends make MUNSON ROTARY BATCH MIXERS ideal for automatic or semi-automatic and straight flow production. Heavy construction good for years of trouble-free service. Optional spray attachments for liquid additives up to 15%. Strip heaters also optional. Write Muson for full information.

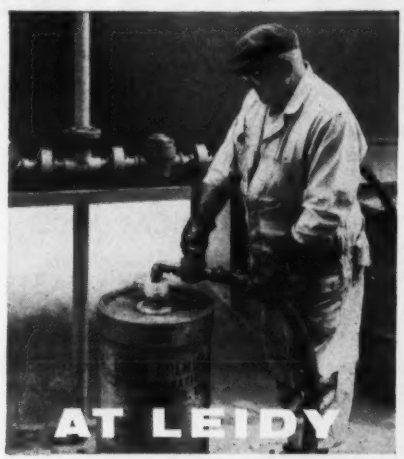
MUNSON MILL MACHINERY CO.

A Division of Divine Brothers Company

200 Seward Ave. • Utica 1, N. Y.

Dry Mixers • Blenders • Hammer Mills • Attrition Mills • Rotary Knife Cutters • Steel Elevator Heads, Leggings, Boots • Electro-Matic Shovel

Check 4023 opposite last page.



Use of UPVC (unplasticized polyvinyl chloride) piping results in substantial cost savings in handling ferric chloride at Leidy Chemical Corporation, Baltimore. Here, tup products include elbows, flanges, tees, plug valves.

Here's data on UPVC piping

You, too, can cut costs with UPVC piping . . . and we can help you! Valuable information on properties, applications and installation procedures is given in tup Catalog 119. Also describes full line of tup fittings, flanges, valves and specialties. Write for free copy.

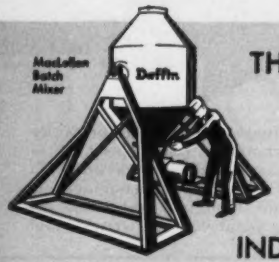
TUBE TURNS PLASTICS, INC.

Dept. CP-9, 2929 Magazine Street

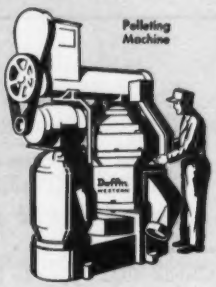
Louisville 11, Kentucky

Check 4024 opposite last page.

NOW Daffin
EQUIPMENT
for
CHEMICALS
PROCESSING AND HANDLING

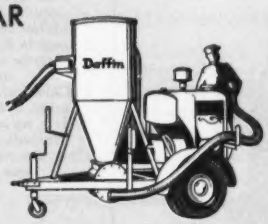


THE EXCELLENCE OF THESE MACHINES HAS BEEN PROVEN IN OTHER INDUSTRIAL FIELDS FOR **GRINDING, MIXING, BLENDING, PELLETING AND PNEUMATIC CONVEYING.**

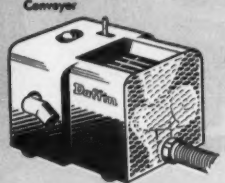


Packaged plant grinds, mixes, blends.

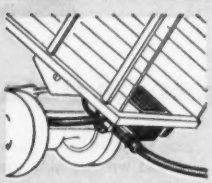
NOW THEY ARE BEING OFFERED TO DO SIMILAR CHEMICAL JOBS . . . EASIER, FASTER, AT LESS COST!



Two-way Pneumatic Conveyor



FREE CATALOGS.


Pneumatic Bulk Truck Unloader

Installation by Factory Engineers. 24 Service-Parts Depots strategically located.

All units also available in stainless steel construction.

Daffin MANUFACTURING COMPANY
3350 North Prince St., Lancaster, Pa., U.S.A.

Check 4025 opposite last page.

Holds feed rate constant with ±0.5% accuracy

Uses: Applicable for feeding a wide range of dry materials in proportioning or metering operations where flow to process must be constant.

Features: Scale controls rate of feed with accuracies of ±0.5%.

Description: Troughed-conveyor, constant-weight belt feeder. Section of belt is supported by manufacturer's Flexure Plate scale which has position-sensing element attached to weigh beam. Element converts supported weight into proportional displacement which in turn is transformed into pneumatic output by transducer.

Constant feed rate, preset on control board of scale, is attained by taking signal from transducer through controller which monitors rate of feeder. Feeder increases or decreases speed to adjust flow as material on belt varies above or below desired weight.

(Gravitrol feeder is development of Thayer Scale Corp., Route 139, Pembroke, Mass.)

Check 4026 opposite last page.

Seamless plastic liner holds corrosives inside pail

Uses: Packaging and shipping acids, alkalis, electrochemicals, insecticides, battery electrolyte, etc.

Features: Approved by Bureau of Explosives to carry corrosive, poisonous, and flammable liquids under ICC-37P specification. Has been successfully subjected to vibration and drop tests from 0 to 125°F.

Description: Developed in

MIX BETTER BY
IMPACT

Finer and more intimate dispersion of solids can be achieved using an Entoleter® centrifugal impact mill.

- Low cost — low power requirements
- Minimum (controlled) temperature rise

RECENT APPLICATION

For the final dispersion of detergent, bleach, perfume and highly abrasive silica flour in a popular powdered household detergent, this 27" model with abrasion resistant impactors does the job.

Free test runs on your material.

Send for literature on Impact Milling, Particle Size Reduction and the new line of Vibrating Screens.

ENTOLETER
DIVISION OF SAFETY INDUSTRIES, INC.

Check 4027 opposite last page.

cooperation with Plax Corporation, the JaLiner consists of a seamless 10-mil blow-molded polyethylene liner inside outer steel pail. Liner is attached to cover. Container is shipped to packager with polyethylene dust cap, ready for filling and closure. Rieke polyethylene Flexspout is packed separately for attachment by filler.

Container is available in five-gal size. One- and 15-gal sizes are being developed.

(JaLiner is made by Container Division, Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pa.)

Check 4028 opposite last page.

Tablet de-dusting

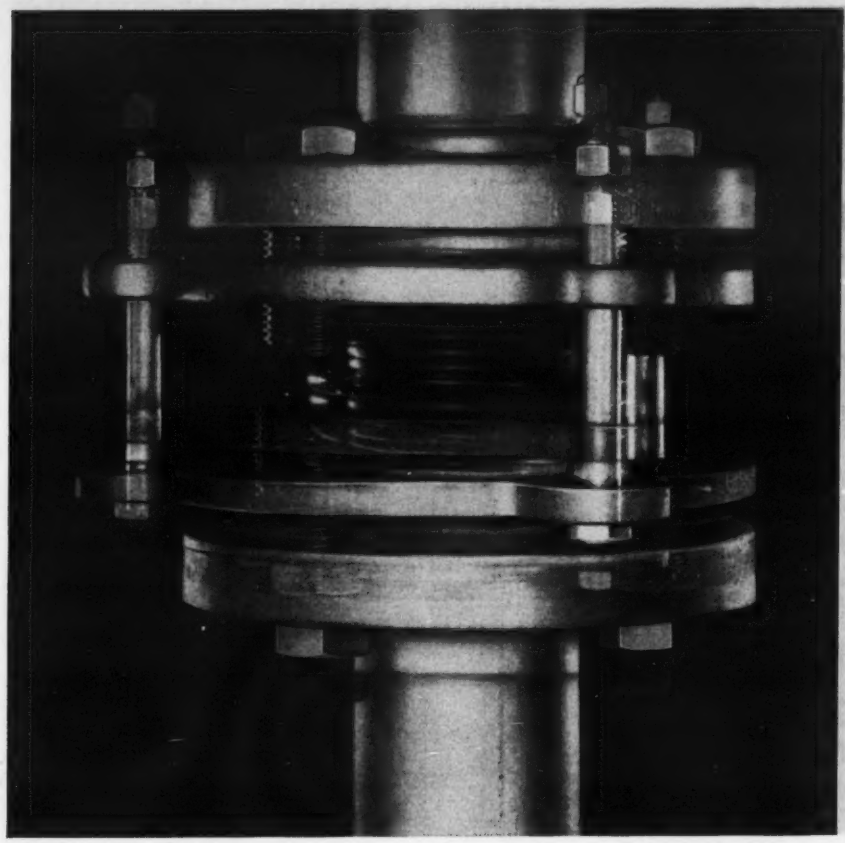
. . . and sharp-edge removal are bonus from use of magnetic vibratory feeders at Warner-Chilcott Laboratories (Div. of Warner Lambert Pharmaceutical Co. Inc.), Morris Plains, N. J. Shown here is one of 17 feeders used in conjunction with rotary tablet presses.

Vibratory action moves tablets upward at slight incline and removes sharp edges and dust, which fall through screen near end of tray, into a container. Remaining perfect tablets discharge into separate bulk container.

Other feeders at the plant deliver material from a continuous dryer, feeding each bucket of a bucket elevator with even load. Still others, interlocked with other equipment, supply the proper number of tablets to tablet strip-packaging machines.

(HI-VI feeders were supplied by Eriez Manufacturing Company, Erie 6, Pa.)

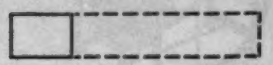
Check 4029 opp. last page.



MOLDED DESIGN

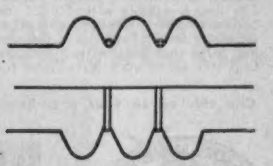
rounded interior convolutions, extra thickness at stress points

HIGH TENSILE STRENGTH



Teflon at its best, Fluoroflex-T provides at least 300% elongation

METAL REINFORCING RINGS



permit greater travel from shorter units, prevent distortion from surges

2 MILLION CYCLES AND STILL FLEXING!

. . . proving that this Teflon expansion joint—molded of Fluoroflex-T —outlasts most other materials and constructions

Chemical manufacturer: Tried Fluoroflex®-T joint, found it *still* flexing after *2 million cycles;* previously had averaged 100,000 cycles from machined Teflon® flex joint in pumping application.

Major industrial product company: Displaced one end of a special Fluoroflex-T bellows ¾-inch from its axis, rotated it around axis at 1,000 rpm. After *20 million cycles,* with still no sign of deterioration, test discontinued.

Petrochemical processor: Installed Fluoroflex-T joints to replace joints machined from Teflon. The Fluoroflex-T joints are still in service after nearly a year.

Fluoroflex-T flex and expansion joints perform so much better for three reasons: (1) *The material:* a patented compound of Teflon that combines high density with low crystallinity for optimum strength and flexibility. (2) *The process:* a unique technique for molding uniform convolutions with restraining rings. This gives undamaged grain structure, rounded interior convolutions and increased strength. (3) *The experience:* Resistoflex has been working with fluorocarbon resins since their inception. For fabricating with Teflon, such experience is *vital.* That's why Fluoroflex-T is Teflon at its best.

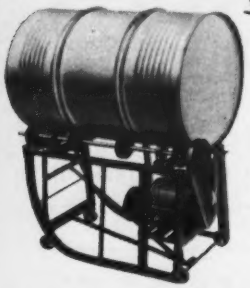
So, for corrosion-proof flex and expansion joints that give unsurpassed working life, specify Fluoroflex-T. Write for Bulletin B-1A. Dept. 300, RESISTOFLEX CORPORATION, Roseland, N. J. Other Plants: Burbank, Calif.; Dallas, Tex.

®Fluoroflex is a Resistoflex trademark, reg., U. S. pat. off.
®Teflon is DuPont's trademark for TFE fluorocarbon resins.

Complete systems for corrosive service **RESISTOFLEX**

Check 4030 opposite last page.

NOW
A LOW COST
Portable Drum
ROTATOR
Safe... Fast... Economical
MORSE
MODEL 200



• MIXING • BLENDING
• TUMBLING • CLEANSING

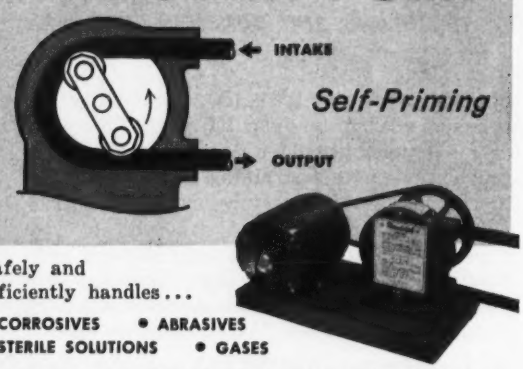
Handles 30 and 55 gal. drums; 1 and 5 gal. containers with special attachment; weight capacities to 500 lbs. Weighs only 135 lbs. Available with 10, 20, or 40 rpm. Exclusive features assure smooth, thorough operation. Neoprene drive wheels are oil and chemical resistant. Retractable casters facilitate loading. Also available with explosion-proof or air-driven motors. Clip this ad to your letterhead for free MORSE Catalog.

Clip this ad to your letterhead for free MORSE Catalog.

MORSE
MANUFACTURING CO., INC.
757 West Manlius Street, East Syracuse, N. Y.

Check 4031 opposite last page.

THE VERSATILE *NEW*
RANDOLPH PUMP



Safely and
efficiently handles...
• CORROSIVES • ABRASIVES
• STERILE SOLUTIONS • GASES

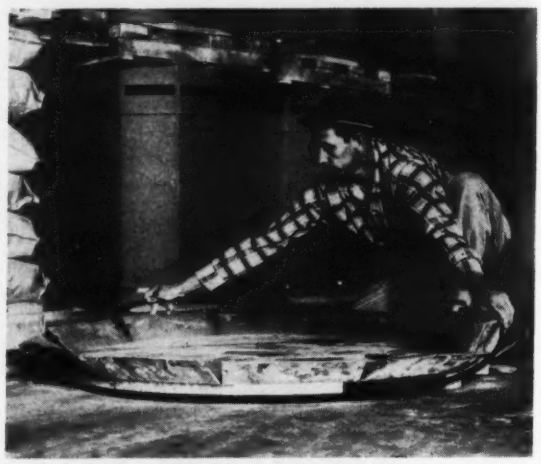
Operates on a principle designed to eliminate all contact of moving parts with the material being pumped. A tube is threaded through the pump body where it is subjected to the squeegee action of a double rotor. The result is a smooth flow of liquid or gas through the tube. Ideal for jobs where corrosion, contamination or abrasion is a problem. Two models — 54 and 185 gallons per hour. Available with or without motor; also with speed controls and explosion-proof fittings.

For dealers in your area contact
THE Randolph COMPANY / 1018 Rosine St. Houston 19, Texas JAckson 6-2091

Check 4032 opposite last page.

Knockdown, corrugated 12-sider carries up to two tons

Replaces rigid drums with savings in shipping, packaging, handling



▲ Bottom cap of container is prepared by folding up scored flanges; then fastening metal band around it

◀ Tube is unfolded and placed in position on the bottom cap

◀ After the tube is filled, top cap is slipped over it and container is ready to be shipped

A 12-sided corrugated container which carries up to two tons of chemicals and which empty can be shipped flat is cutting shipping and handling costs for Monsanto Chemical Company and other users.

Monsanto, a leading user, ships 3000 lb of calcium phosphate in each. Other manufacturers use them to ship petroleum catalysts, sulfonates, titanium dioxide, and rubber. Other possibilities are for shipping cement, hydrated lime, carbon black, sodium nitrate, and barytes.

While dollar and cent figures showing extent of savings realized by users are not available, some insight into economies possible may be gained from the fact that the containers can be shipped knocked down 500 to a railway car — a significant saving in shipping over rigid drums formerly utilized. Loaded containers can be shipped 26 to a rail car and 16 to a truck.

Manufacturer considers container ideal for packaging material in 1000 to 4000 lb/unit range, provided volume permits its use.

Containers are unitized and shipped completely flat to users. Tube, top cap, bottom cap (with fiberboard or wooden runners attached) comprise unit. Tube has 12 scores which are broken before it is set up in bottom cap. Bottom cap is prepared by bending flanges along score line at 90° angle or folding flange up from horizontal to vertical position, and then fastening preset metal band around it. After container is filled, top cap is placed over tube.

Bottom cap is virtually sift-

proof and top cap fits snugly enough to prevent leakage. Turnback on main tube corresponds with turn-in on bottom cap flanges to provide bottom cap with interlocking feature which prevents tube from pulling out of bottom cap. Depth of top cap makes for tight-fitting closure, virtually impossible to knock off. One man can assemble tube and caps ready for use within five minutes without using tools.

Containers may be stacked two-high, and differ from conventional containers in that they do not require inner sleeve when packed. Cylindrical shape adequately withstands pressures exerted upon main tube by container stacked atop it.

Maximum standard diameter of container tube is 49" — height can be as much as 72", depending upon amount of material to be shipped.

(Twelver containers are development of St. Regis Paper Company, 150 E. 42nd St., New York 17, N.Y.)

Check 4033 opposite last page.

Silicon chargers for speedy recharging of electric industrial truck batteries are explained in two-page Bul AR-103 — C & D Batteries, Inc., Washington and Cherry Sts., Conshohocken, Pa.

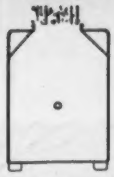
Check 4034 opposite last page.

Continuous weigher which weighs material continuously while in motion is subject of Bul 958— Stephens-Adamson Mfg. Co., 11 Ridgeway Ave., Aurora, Ill.

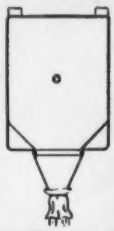
Check 4035 opposite last page.

NEXT MONTH

Manufacture of taconite pellets requires large amounts of bentonite and soda ash, both of which are hygroscopic and will pack and stick if they pick up moisture. Pneumatic conveyors do the handling in a Mesabi Range plant, where all material movement is in the hands of one man at a central panel. See this section in October for a report on this "damp-proof" system.

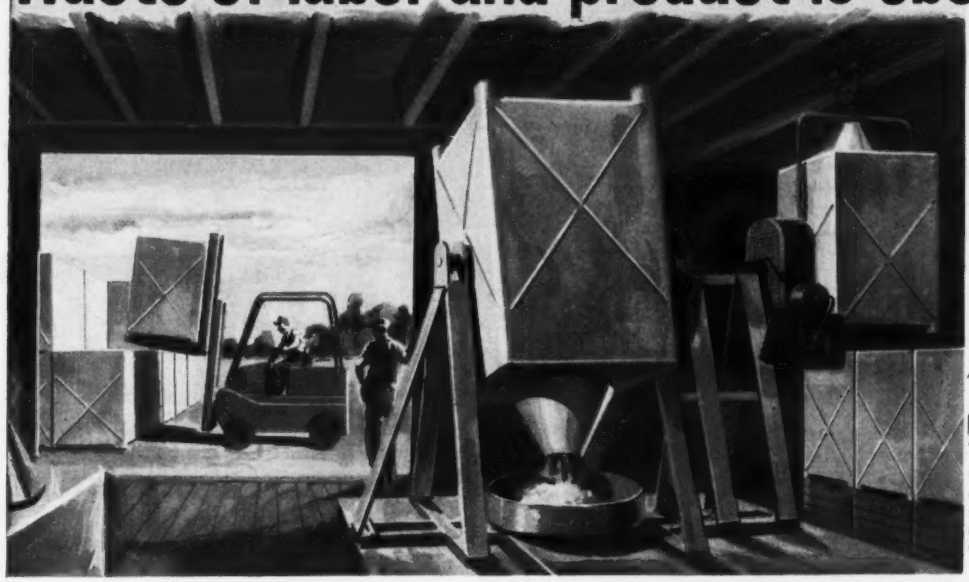


Fills Fast—22" opening permits fast filling of powdered materials. Internal cone conforms to angle of repose of product.



Empties Clean—Internal cone funnels all materials out of bin. No residue remaining.

Waste of labor and product is obsolete...



Stores Outdoors—Weatherproof, turns yard area into warehouse. Stacks 2 high.

Cuts Shipping Costs—low cost flat-bed equipment considered part of special rail car with "freight free" advantages.

* Lic. under pat. #2862645

Waste of labor, product, floor space, time is now outmoded—eliminate it in your plant today.

Powell's new Invert-a-bin* Semi-Bulk Handling System has put an end to the biggest headache in handling granular products. These sturdy, easy-to-handle steel or aluminum containers are easy to fill and easy to empty. Weatherproof, they can be stored outdoors freeing indoor storage areas for production.

Ideal for inter-plant or intra-plant these units are considered part of special rail car with "freight free" advantages. Due to the simplicity of design, maintenance of the Invert-a-bin* is nil.

Why continue losing time and money with old style disposable packages when this remarkable new Invert-a-bin* is immediately available on either lease or purchase. Write for literature today!

THE POWELL PRESSED STEEL COMPANY

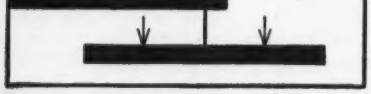
HUBBARD, OHIO

Check 4036 opposite last page.

How did this team solve an age-old weighing problem?

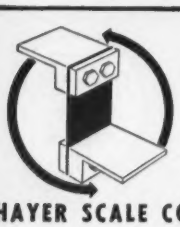
Since 5,000 B.C. men have been trying to devise a pivot balance that would be highly sensistive yet remain accurate. The breakthrough came in 1956 when the United States issued a patent for a "Thayer Flexure Plate" Leverage System. A team of engineers and businessmen, aware of industrys great cumulative loss of materials in weighing operations, had invented a revolutionary new scale.

Knife-edged pivots that progressively wear and change were replaced by Thayer Flexure Plates that move only .001", yet accurately reflect the minutest changes in weight. This *firmly joined* lever withstands shocks and vibrations indefinitely. Dirt and dust are no longer a problem. Thayer guarantees this leverage system accurate for the life of the scale.



How Can It Save You Money Year After Year?

Working in conjunction with straight electrical controls, it forms the most reliable, low maintenance system ever devised to control processing or materials handling *by weight*. Literature on its application to filling, batching and checkweighing operations is available on request.



THAYER SCALE

AUTOWEIGHTION SYSTEMS FOR FILLING, BATCHING AND CHECKWEIGHING

THAYER SCALE CORP. THAYER PARK, PEMBROKE, MASS.

Check 4037 opposite last page.

Spring-retained axles speed roller mounting on conveyor frames

Mounting of rollers on conveyor frames is simplified with use of spring-retained axles.

Installation is simply matter of inserting one axle end in hex hole of frame, depressing other manually, and releasing it into hex hole of opposite frame.

Spring-retained axles will be furnished by manufacturer as standard practice in both plain bearing and dust-tight construction with all 7/16" hexagonal axles.

Rollers, available in 1⅞", 2¼", and 2½" diam, are equipped with high-capacity steel ball bearings designed to give two-point contact between balls and races, and to take end thrust. Load capacity rating is approximately 150 to 250 lb per roller.

With 10-gage frame, minimum roller length is 8"; while on 3/16" thickness and special frames, minimum roller length is 10" or longer.

Multiple spacing of punched holes in frames simplifies changing of rollers.

(A-F rollers with spring-retained axles and frames are manufactured by The Alvey-Ferguson Co., 3321 Disney St., Cincinnati, Ohio.)

Check 4038 opposite last page.

Gummed tape dispensed by electronics

Compact, simple unit uses kraft or reinforced types

Uses: Controlled dispensing of gummed kraft or reinforced tape.

Features: All controls are electronic in compact 10 x 16 x 11" machine. Manufacturer

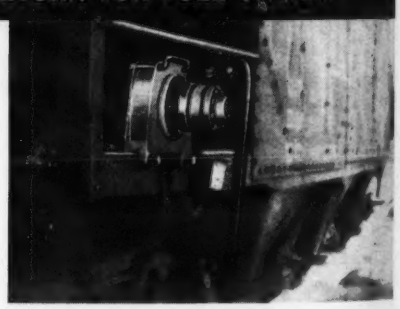
VIBROLATOR®

CCVP 3000 Hopper Car Shaker

MUST UNLOAD HOPPER CARS TO YOUR COMPLETE SATISFACTION OR, RETURN FOR FULL CREDIT

Smallest, heavy duty portable hopper car shaker manufactured, yet guaranteed to exceed the performance of any size portable car shaker on the market.

Because of this unit's compact size, two simple mounting brackets, and handy carrying handle, it permits one man to handle **all** your hopper car unloading operations, quickly and easily.



REDUCE LABOR COSTS AND DEMURRAGE

Quickly mounted on hopper-car end sill, as illustrated, the CCVP 3000 rapidly unloads the most difficult material regardless of extent of bridging, packing, hanging-up, etc. And although primarily designed as a hopper car shaker, the CCVP 3000 is ideal for movement of any wet or dry material from massive hoppers, bins, chutes or conveyors.

Pneumatically driven, these units are quiet, spark proof, will not overheat and can be precisely controlled through a range of a few cycles to more than 60 cycles per second with an ordinary valve in air supply line. Call your distributor or write for free catalog.

*"VIBROLATOR" is Martin's registered trade mark for its vibration inducers and vibrator accessories.

"Vibrolator" vibrators are available in many sizes, "pocket watch" to the most powerful hand-portable unit built.

MARTIN ENGINEERING COMPANY 155 Kemp St. Neponset, Illinois

Check 4039 opposite last page.

reports that unit has 40% less parts than is normally found in such a device.

Description: Dispenser is available in two models. One, DB-E1, has two easy-set tape lengths, each instantly changeable, and one random tape length for visual operation. Second, DB-E2, is visual machine with random length control, but which can

Pushbutton controls tape dispensing

be converted to operate like the DB-E1 by simple control change.

Operating on 110v, 60-cy AC, each will deliver 40″ of tape a second. Adjustable tape-width dividers permit use of tape from 2 to 3″ wide. Heater is thermostatically controlled. Foot switches and printing device are available as accessories.

(Electronic tape dispenser is product of Diagraph-Bradley Industries, Inc., PO Box 269, Herrin, Ill.)

Check 4040 opposite last page.

Sit-down truck with inching control has features and specifications listed in six-page bulletin. Installation photographs show use in various plants. Form SD-459—Lamson Mobilift Corporation, 835 S.E. Main St., Portland 14, Oregon.

Check 4041 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

1,322 COLORS of paint are offered by every paint dealer featuring the Colorizer Paint Color System. Adding Colorants to the base paint is a quick, easy, clean job—thanks to Colorizer's tough new "Colorpods" of "Scotchpak" Heat-Sealable Polyester Film.

"SCOTCHPAK" TAKES OVER

...streamlines a multitude of packaging jobs!

Looking for a film that's *tough*, clear as glass—one you can freeze or boil? And would you like that same film to be heat-sealable with a seal that's as tough as the film itself? Then your answer is "Scotchpak."

Here is a film that combines the best features of many films. It can be heat-sealed in less than 2 seconds—a temperature of 300° to 400° F. and 20-60 psi is all that's required.

"Scotchpak" Film resists freezing cold (down to -70°F.) and boiling heat (up to 240°F.). It resists acids, oils, alkalies and organic solvents. It is light (saves shipping costs!) and compact (saves space in shipping and on the shelf, too!)

"Scotchpak" is now available in roll-stock widths up to 50 inches—from 2 mils to 4.5 mils thick, ready for printing—if you desire. It can be easily handled on conventional bag-making and filling equipment.

Our Customer Service organization is ready to work with you to show you how "Scotchpak" can solve your film fabrication and packaging problems. For complete information, write Film Products Group, Dept. CAE-99, 3M Company, St. Paul 6, Minnesota.

SCOTCHPAK BRAND
SCOTCHPAK BRAND
SCOTCHPAK BRAND
SCOTCHPAK BRAND
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SCOTCHPAK® BRAND
HEAT-SEALABLE POLYESTER FILM
SCOTCHPAK BRAND

"SCOTCHPAK" IS A REGISTERED TRADEMARK FOR THE HEAT-SEALABLE POLYESTER FILM OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO

MINNESOTA MINING AND MANUFACTURING COMPANY
...WHERE RESEARCH IS THE KEY TO TOMORROW
3M COMPANY

Check 4042 opposite last page.

Photographs shows an Ajax Lo-Veyor installed out of the way below the floor. Floor grids similar to those shown in foreground removed to show arrangement of combination conveyor pan and screen.

AJAX Vibrating Conveyors
Do Two Or More Jobs

for price of one machine

With today's skyrocketing costs, the importance of reducing non-productive expense was never more urgent. Large and small plants are saving money in first cost, processing cost, and maintenance cost with Ajax Lo-Veyors engineered to fit your requirements.

Photograph shows an installation designed to simplify and speed up handling and separating bulk materials flowing from 10 production lines.

Send for latest AJAX SELECTION GUIDE

Learn how Ajax Vibration Engineering Service can help you cut your costs. Phone, write, or send coupon for your copy of this helpful book.

AJAX®

AJAX FLEXIBLE COUPLING CO. INC.
24 Portage Road, Westfield, N. Y.
In Canada—The Alexander Fleck, Ltd., Ottawa

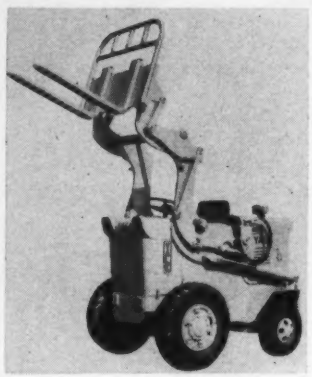
Please send Ajax Lo-Veyor Selection Guide to

Name_____

Concern_____

Address_____

Check 4043 opposite last page.



Shovel-to-fork-truck

. . . conversion is possible with new quick-change standard lift-truck fork carriage which can be installed on manufacturer's V-18 tractor shovel by removing four pins and four bolts to replace bulk-handling unit with pallet-handling device.

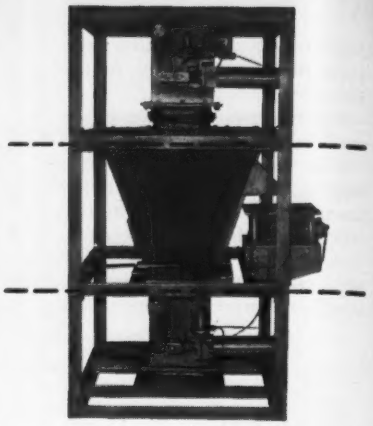
Front plate of shovel carriages on 2000- and 3000-lb trucks accommodates same type forks as on manufacturer's G-52 gasoline-powered lift trucks. Maximum lifting height of Y-18 with fork attachment is 92″, and operating capacity at 24″ load center is 1500 lb.

(Quick-change fork carriage is made by Yale Materials Handling Division, The Yale & Towne Manufacturing Division, 11,000 Roosevelt Blvd., Philadelphia 15, Pa.)

Check 4044 opposite last page.

"I'm on a liquid diet!"

THE W-C HOPPER SCALE



standardized components adapt it to a full range of material handling methods, control instrumentation

Take a good look at this hopper scale. It has many practical features for almost any weighing application.

Take the upper and lower frames. They are designed to accommodate many standardized feed and discharge components: sliding gates, vibratory feeders, screw feeders and others. These units are pre-engineered; their performance has been fully proven in use. Costs are, therefore, correspondingly lower. Satisfactory operation is confirmed in advance.

Now look at the middle or hopper frame. Note the flexure mountings. They give stability to the unit and deliver a single component of force to the weight transmitter regardless of load distribution. The transmitter, itself, may be either electric or pneumatic; the signal can be used for weight indication, recording, automatic batching.

Write for Catalog 12.
Clear text, lots of pictures.

W-C

S.A. 1059

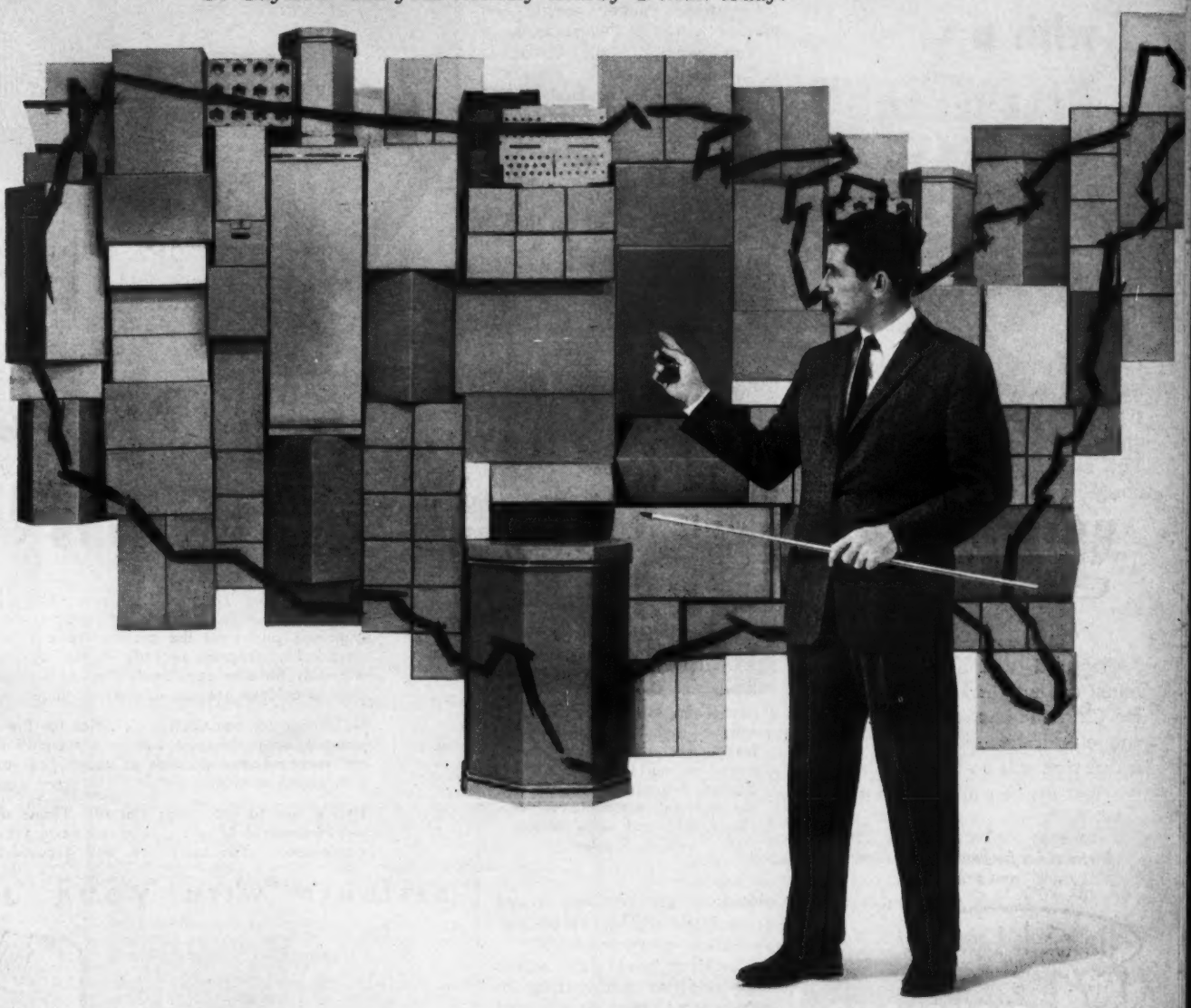
WEIGHING and Control COMPONENTS, Inc.
206-A Lincoln Ave., Hatboro, Pa.

Check 4045 opposite last page.

GAYLORD GIVES LOCAL SERVICE
ALL OVER THE PACKAGING MAP

At every important packaging crossroads, coast to coast, there's a Gaylord Container plant or office to serve you. Your inquiry brings a quick reply — with no detours through channels or over mountains of red tape.

Avoid the byroads. Take the high road to full packaging flexibility. Go Gaylord. Call your friendly nearby G-Man today.



GAYLORD
CONTAINER CORPORATION

Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

For more information on product at right, specify 4046 see information request blank opposite last page.

STICKY BINS

are no problem with a

CLEVELAND VIBRATOR

A Cleveland Vibrator keeps bulk chemicals flowing freely from any type of bin. Constant shaking breaks up arches and jams before they start. You save time, and your bins are not damaged by hammering.

AIR ELECTRIC

Cleveland Vibrators are low in initial cost and inexpensive to operate. Cleveland manufactures both air and electrically operated vibrators. Either type will do the job; pick the one that fits best in your plant.

Write today for complete literature and prices.

Dept. 9C, 2706 Clinton Ave.
Cleveland 13, Ohio

Check 4047 opposite last page.

Bags filled automatically to weight repeatability within ± 0.2%

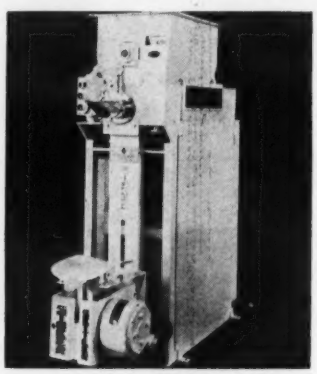
Capacitance switch used for weight control

Uses: Automatic filling, into valve or open-mouth bags and drums, of preset weights of powdered, granular, pelleted, or flaked materials.

Features: Packer weighing system utilizes capacitance switch instead of limit switches for weight control. Switch capability is 30 operations per sec. Repeatability accuracy is within ±0.2% of set weight.

For changeover to different product and/or container size, auger feed screw can be quickly removed without tools and easily cleaned.

Description: As scale platform is raised or lowered with weight applied, aerial plate of capacitance switch opens and closes air gap between it and ground plate. This varies capacitance between plates.



In changing to different product and/or container size, auger feed screw can be quickly removed without tools and easily cleaned. Bag packer shown here has optional automatic settler (lower left) and large ribbon-agitator hopper

Resulting voltage signal trips relay at zero setting. In turn, control relay is actuated to operate motor-feed switch.

Packer incorporates built-in beam-scale and leverage system. Leverage system is similar to platform scale with 100:1 ratio. Changeover to new weight involves only movement of poise to value equal to desired weight plus tare.

STUBBORN LIQUID-SOLID SEPARATION PROBLEM?

2827

Remarkable progress has been made, recently, in the application of centrifugal force.

ROBERTS CENTRIFUGALS

Unhappy about the product volume which you are able to achieve? Disgruntled about product quality? Why not call in one of our application engineers and treat the problem to a new approach? We have made remarkable progress recently in the application of centrifugal force to materials hitherto considered "out-of-bounds." Chances are we will be able to achieve greater volume and higher quality for you, too.

No charge for consultation . . . Nor for the laboratory tests which usually precede or supplement our recommendations. And if you wish to test our recommended procedures under your own roof, we can supply you with rental machines.

Here's how to get things started! 'Phone us today . . . Hamilton, Ohio —Twinbrook 4-4758 . . . and ask us to set up a conference date at your convenience. You can't lose, and it *could* be the break you've needed.

DESIGNED WITH YOUR JOB IN MIND

If you have no present problem, but do want the latest centrifugal information, ask for our NEW, FREE BULLETIN NO. 2827.

ROBERTS STEVENS
The
WESTERN STATES
MACHINE COMPANY
Sales Offices New York, N. Y.
General Offices and Plant
1702 Fairgrove Avenue
HAMILTON, OHIO, U.S.A.

Check 4048 opposite last page.

Dial control, directly under visual over-under indicator, permits re-adjustment to preselected weight without stopping entire operation.

(DX bag packer is product of H. L. Stoker Company, Box 112, Claremont, Calif.)

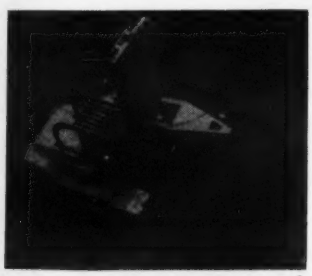
Check 4049 opposite last page.

Boom adapts lift trucks for handling of rubber collapsible containers

Uses: Attachment adapts manufacturer's line of lift trucks for handling collapsible rubber containers (Sealdbin made by Container Products Division of United States Rubber Company) used in shipment and storage of chemicals.

Features: Boom's 68" reach permits rapid loading and unloading of gondola cars commonly used for shipping containers.

Description: Boom, which replaces load arms and carriage on manufacturer's lift trucks of 1½- to 10-ton capacities, features ram-type hook and fairlead guides that facilitate positioning.



Boom attachment for lift truck solves problem of handling bulky spheroid containers

Hook is slipped into ring at top of spheroid and is then elevated for hauling. Sway brace which may be folded out of way steadies container in transit. Hydraulic winch with cable hook is optional for handling collapsed containers.

(Sealdbin boom was designed for its lift trucks by Hyster Company, 2902 N.E. Clackamas St., Portland 8, Ore.)

Check 4050 opposite last page.

Built tough

for round-the-clock service in grueling applications

Pre-Bilt conveyors are available in belt widths of 18, 24, 30 and 36 inches. Truss and channel structural frames are designed to AISE standards for spans up to 50 ft. Supporting bents, chutes and other accessories are standardized.

All these advantages from selection to erection with pre-engineered units

EASY SELECTION from standardized Link-Belt components. Your Link-Belt sales engineer will help you select the right combination.

ON-THE-SITE QUOTATIONS by a trained sales engineer. He will prepare a prompt quotation on all components necessary for efficient operation.

LOW FIRST COST. Pre-engineered, shop-assembled components, prompt delivery, fast erection time—all result in lower initial costs.

LOW OPERATING COSTS. Due to rugged design, maintenance normally consists only of lubrication. More economical based on cost per ton handled.

QUICK DELIVERY. Pre-Bilt sectional belt conveyors are manufactured and shipped from one of nine plants located nearest your operations.

FAST, LOW-COST INSTALLATION. Simple construction facilitates field assembly, reducing time and costs of erection.

LINK-BELT Pre-Bilt belt conveyors bring savings from the start

Speed, economical operation and dependability—conveying features required in every industry—are provided by Pre-Bilt Sectional Belt Conveyors. They stand up in the most rugged, full-time operations. And normally the only maintenance required is lubrication.

The same engineering design which has produced some of the world's outstanding conveyor systems is applied to Pre-Bilts. Standardized, shop-assembled components are selected to specifically fit your installation. Simple construction provides ease of handling and erection.

No other conveyor offers such rugged design and economy of operation in bulk materials handling. Call your nearby Link-Belt office for complete information. *Or write for Catalog 2779,* a new "Idea Book" for cutting costs with Link-Belt Pre-Bilt sectional belt conveyors.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,193

Check 4051 opposite last page.

The Electronic Load Cell Brings New Versatility To TOLEDO SCALES

Now The Dial Can Be Located Anywhere You Want It!

● **The advantages of load cell operation are available in . . . axle load scales . . . motor truck scales . . . crane scales . . . hopper scales . . . tank scales . . . built-in scales . . . floor scales . . . custom test devices.**

Add the flexibility of load cell operation to traditional Toledo accuracy and dependability . . . and you have a whole new concept of weighing ease and convenience.

Normally, the indicating element of a scale must be connected mechanically to the lever system. Not so, however, with load cell scales. You can locate the big 20" Toledo dial anywhere you want it, because only electrical connections are needed. And smooth, reliable Toledo servo action assures fast dial indicator response.

Already you may have in mind weighing or testing applications in your operations, where performance-proved Toledo load cell scales can provide new flexibility to save time, cut costs, improve efficiency.

These modern Toledos are available either as full Load Cell scales, or as Lectro-Lever scales. The latter combines a mechanical lever system with a load cell mounted in the nose iron or in the steelyard, and provides the benefits of remote indication where this combination is desired.

Toledo recording and indicating accessories are available with Toledo Load Cell Scales, including Toledo Printweigh "400" which prints full-figure weight data on tickets, strips or sheets.

All Toledo Electronic platform scales have the exclusive features and superior accuracy of a self-aligning post suspension system.

Ask your Toledo representative about new Toledo Load Cell Scales for your needs. Or, SEND FOR BULLETIN 2970. TOLEDO SCALE, Division of Toledo Scale Corporation, Toledo 12, Ohio.

SERVICE Factory-Trained 240 Cities

TOLEDO®

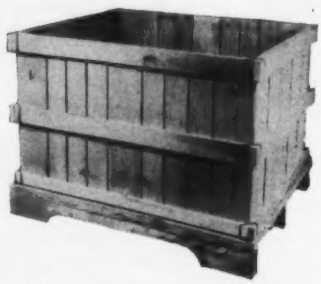
greatest name in weighing

Check 4052 opposite last page.

Tie-corner construction of reusable pallet box assures tight corners

Uses: Shipping, handling, and storing applications for which slat-side pallet boxes are suitable. Fine granular products may be handled without liners when plywood sides are utilized.

Features: Low initial cost and reusability reduce material handling costs. Tie-corner construction assures tight corners through repeated assembly and disassembly.



Reusable tie-corner pallet box

Description: Standard boxes are constructed of hardwood side slats fastened to heavy hardwood cleats. Metal clips hold sides to pallet, and restraining cleats on base prevent bulging.

To assemble, three sides are positioned on pallet by hooking clips under notched restraining cleats. Fourth side is then pushed inward until clip drops into position.

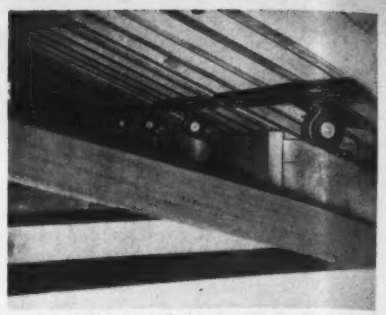
Preformed tie-wires snap into notches on cleats which overlap face boards. Closure is tightened with twisting tool and excess wire snapped off. Then twisted wire is pressed into groove.

(Generalift tie-corner reusable pallet boxes are product of General Box Company, 1825 Miner St., Des Plaines, Illinois.)

Check 4053 opposite last page.

Screw feeder constructed of stainless steel is shown, with specifications and features, in Stainless Steel Screw-feeder Bul—M-H Standard Corp., 515 Communipaw Ave., Jersey City 4, N. J.

Check 4054 opposite last page.



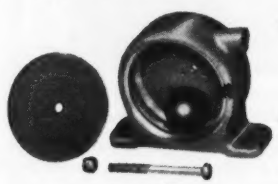
AiroViber installation is simple, low-cost.

Keep bulk materials MOVING!

Gain Quiet, Efficient Materials Movement and Low-Cost, Maintenance-Free Operation with AiroViber Vibrators!

Wherever you load, unload, move, package, process, grade or separate bulk materials, you can keep them MOVING with simple, ball type, pneumatically-operated AiroViber Vibrators!

- Start without fail.
- Trouble-free — only one moving part.
- Completely uneffected by surrounding conditions or temperatures.
- No lubrication needed.
- No periodic maintenance required.
- Speed is controlled by air valve.
- Amplitude can be altered.
- Where explosive conditions exist bronze balls may be used.



Steel ball (only moving part) rolls on hardened, ground track.

WRITE TODAY for full information!

VIBER COMPANY 726 S. Flower St. Burbank 46, California

VIBER CO

Pioneers and leaders in the manufacture of

VIBRATORS

Check 4055 opposite last page.

THAT'S INTERESTING

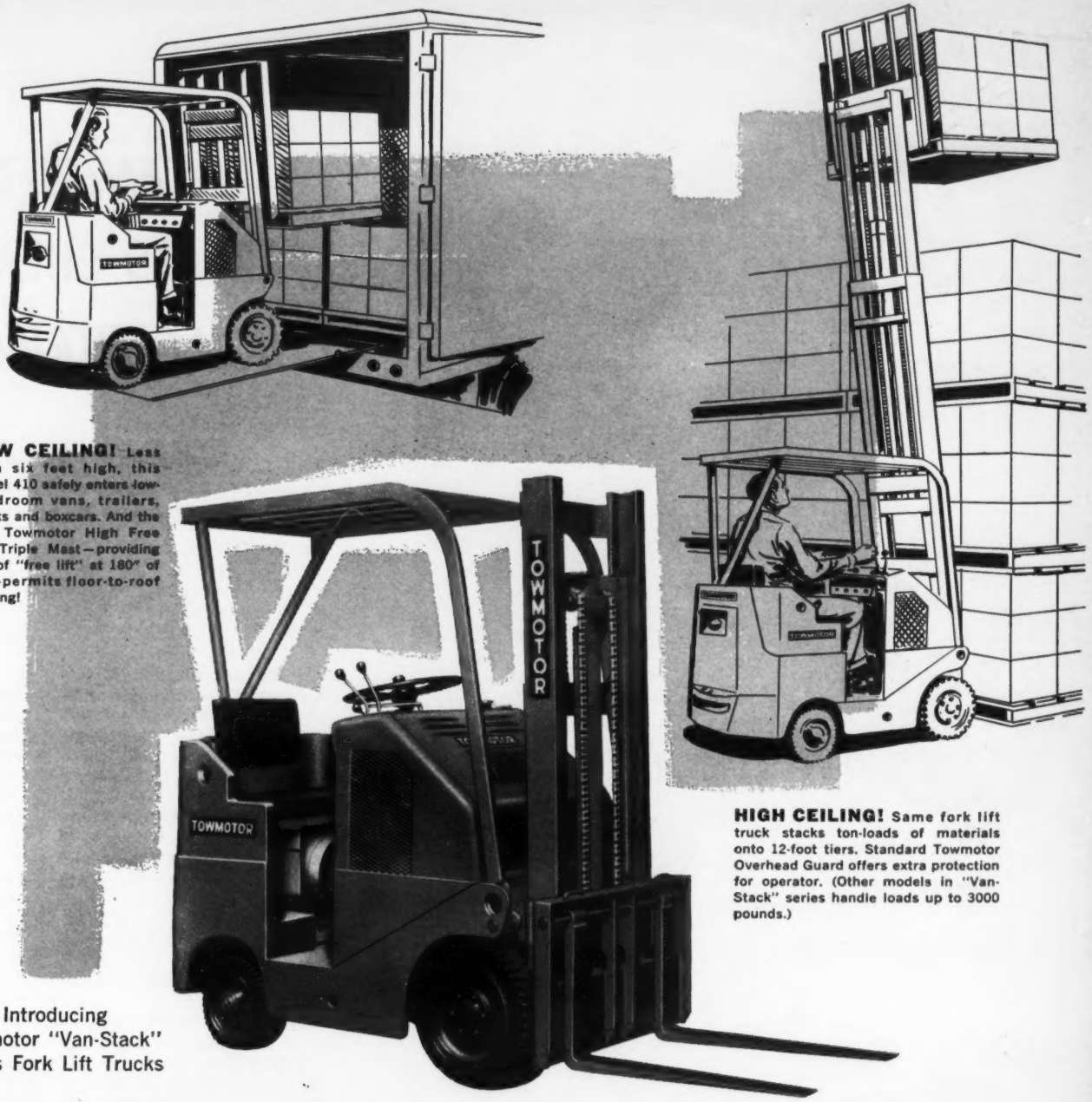
Famine feared

A new source of energy is needed to stave off possible famine because of depletion of petroleum reserves, says a University of California professor. Paradoxically, a contributing factor toward smaller oil reserves is the agricultural industry, whose widespread use of the internal combustion engine enables 15% of the population to feed the entire country and parts of the rest of the world.

Drug eases heart pain

Heart-disease sufferers may take new hope from a new drug to ease pain of angina pectoris. It is monamine oxidase inhibitor. Use of drug on 43 patients in a California hospital resulted in 20 reporting complete relief from pain.

For more information on product at right, specify 4056 see information request blank opposite last page.



LOW CEILING! Less than six feet high, this Model 410 safely enters low-headroom vans, trailers, trucks and boxcars. And the new Towmotor High Free Lift Triple Mast—providing 65" of "free lift" at 180" of lift—permits floor-to-roof loading!

HIGH CEILING! Same fork lift truck stacks ton-loads of materials onto 12-foot tiers. Standard Towmotor Overhead Guard offers extra protection for operator. (Other models in "Van-Stack" series handle loads up to 3000 pounds.)

Introducing Towmotor "Van-Stack" Series Fork Lift Trucks

New Towmotor does double duty!

You'll profit in many extra ways by owning a new Towmotor "Van-Stack" Series Fork Lift Truck.

"Almost unbelievable—but I saw it!" said an amazed MHI Show-goer who witnessed this double-duty lift truck in action in June. Thousands saw it drive in low-headroom trailer, load it to roof, then stack heavy units on 12-foot high tiers.

This truck (only 32" wide) zips through congested 3-foot aisles—maneuvers sharp corners—hustles big loads indoors and out—and enters elevators for fast floor-to-floor service.

On top of all this, its increased hoisting speed, dual-entry convenience, powerful 4-cylinder "economy" gas or LP-gas engine, weatherproof instrument panel—and other exclusive Towmotor features—make it the foremost fork lift truck in 2000-3000 pound class! Ask for *"Van-Stack" Series Folder SP-25.* Write Towmotor Corporation, Cleveland 10, Ohio.

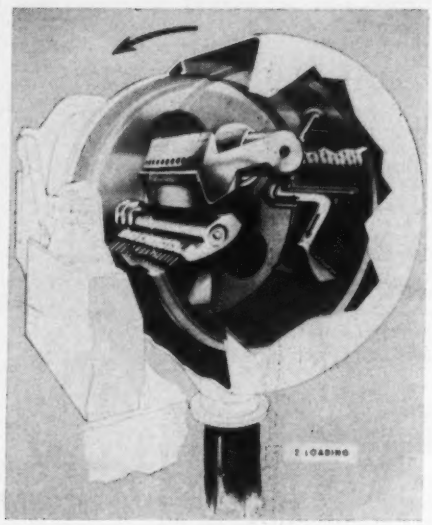
TOWMOTOR® THE ONE-MAN GANG -GERLINGER LEADERS FOR 40 YEARS IN BUILDING FORK LIFT TRUCKS, CARRIERS AND TRACTORS

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

CENTRIFUGE "TREATS CHEMICALLY" AT HIGH CENTRIFUGAL FORCE

Application of high centrifugal force (up to 1250 times gravity) and built-in flexibility provide for high capacity

1.



2.

3.

4.

5.

Drawings show sequence of operations

1. Screen Rinse—Rinse liquid is sprayed over residual crystal layer (shown in color)

2. Loading—Feed slurry is distributed uniformly by feed nozzle

3. Cake Rinse—After crystal layer is established, and feed cut off, a metered quantity of rinse liquid is applied

4. Drying—Cake is subjected to centrifugal force and rinse liquid is drained

5. Unloading—Unloader knife diverts dry solids into discharge chute and leaves a predetermined depth of cake as a precoat

USES: Dehydration of organic and inorganic crystals. Unit is especially suited for de-liquifying polyolefins and fine hydrocarbons, where "chemical rinse" treatment is required.

Features: Centrifuge provides for a broad range of production requirements under diversified conditions, such as:

1) Wide variation in concentration of crystals in slurry.
2) Intermittent or fluctuating loads.
3) Crystal size changes from load to load.

Description: Operation of the unit is automatic and cyclic, as each load is separated from mother liquor, rinsed to desired purity, spun to dryness, and discharged. Cycle repeats automatically while centrifuge operates at full speed. Typical cycle may vary from 20 seconds to 3 minutes, depending upon material being handled.

Five Operations

Cycle of operation is as follows:

1) Cake Rinse

Once the basic crystal layer has been established, serving as a precoat for the next load, a pneumatically-operated rinse valve opens to admit a metered quantity of rinse liquid. This is applied uniformly over the surface of cake.

2) Loading

Feed slurry is admitted through a pneumatically-operated valve. Cake distributor is held on surface of load by hydraulic pressure to distribute it uniformly. Under action of centrifugal force, mother liquor passes through layer of crystals and supporting screen, through holes in perforated basket, and discharges from bottom of casing.

Feed cutoff is controlled by the timer or by action of a switch on leveler arm, whichever action occurs first.

3) Cake Rinse

Once crystal layer is established one or more cake rinses are supplied automatically and sequentially. Idle periods between extra cake rinses are provided to separate mother liquor from cake rinses.

4) Drying

This is accomplished by spinning after cake rinse timer runs out. Spin time is actuated automatically and is adjustable between 0-120 seconds. Free draining materials usually require about 10 seconds. Slow draining up to 60 seconds.

5) Unloading

On completion of drying cycle, hydraulic power applied to the unloader knife, raises it into the cake and diverts the solids layer from the basket to discharge chute.

Stroke of knife is controlled by mechanical stops to leave a predetermined depth of cake, as heel in the basket. This serves as a precoat for the next load. Motion of the knife is then reversed and blade is returned to its "off" position.

Automatic Devices Control Cycle

Throughout the entire cycle, operation is accomplished automatically by means of adjustable electric timers, pneumatic and hydraulic controlled valves, and cylinders. All are interlocked mechanically and electrically. Adjustable features permit complete flexibility of operation. Program control may be provided to sequence a battery of machines so discharge can be sequentially handled.

Design and Construction

Exterior casing encloses basket and receives mother and rinse liquors. A separate compartment receives any overflow or splash and permits material's direct return to feed system, thus eliminating contamination of mother liquor. Back plate and hinged front door are standard dished heads.

Hinged door performs three functions:

1) Permits access to interior without disconnecting process piping.

2) Seals unit.

3) Provides mounting of feed distributor, unloader, and solids discharge chute.

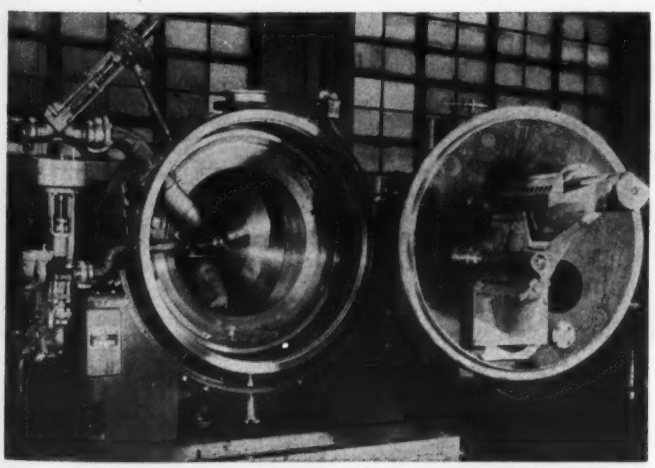
Feed system includes air-operated feed valve, feed tube, and feed nozzle. Adjustable plate on nozzle permits additional control of feed.

Cake distributor consists of a balanced holder and extends across width of basket. Distributor is keyed to shaft whose motion is controlled by a hydraulically-operated lever arm.

Centrifuge operates at 1260 rpm. Net weight is approximately 16,000 lb. Overall dimensions are 110 x 96 x 98" wide. Total volume as discharged is 7.5 cu ft. Maximum crystal depth is 5". Machine can be fitted with motors ranging from 75 to 250 hp, depending upon application.

(Sharples C-41 Super-D-Hydrator is product of Sharples Corporation, 2300 Westmoreland St., Philadelphia 40, Pa.)

Check 4057 opposite last page.

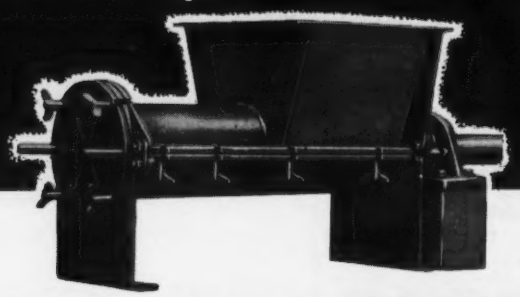


Hinged door on centrifuge permits easy access to interior

Rietz

CUTS PASTE MIXING COSTS AS MUCH AS 90%

Tested by a leading producer of solid rocket fuels and compared with paste-mixing equipment costing ten times as much, Rietz Extructors exhibited dramatic highs in production efficiency and substantial design and construction advantages.



RIETZ EXTRUCTOR

AS A CONTINUOUS PASTE MIXER

Performance

Mixing efficiency as checked by radio-active tracers . . . 99.7% *(This figure is now somewhat higher because of modifications introduced since the test.)*

Dollar per ton mixing cost 80% to 90% less than other equipment tested. *(Based on initial investment and operating cost.)*

Design

Much easier to clean as all parts of the crevice-free interior are readily accessible.

Mechanically simple with a minimum of moving parts.

Practically no maintenance because of rugged all-welded construction and slow-speed, high torque operation at very low horsepower.

RIETZ EXTRUCTORS are available in a varied range of capacities in carbon or stainless steel, and with a selection of extrusion plates to adapt to any paste mixing requirement, and for the efficient mixing of dry powders and granular solids.

OFFICES IN PRINCIPAL CITIES

Rietz MANUFACTURING CO.

Santa Rosa, Calif. • West Chester, Penna.

DISINTEGRATORS • PREBREAKERS • EXTRUCTORS • THERMASCREWS

Check 4058 opposite last page.

Sound waves shake dust from filter bags

Provide effective cleaning with no wear on bags

Sonics are now being used to clean filter bags on dust collectors. The method is reported to give highly effective cleaning action with no wear on bags. Maximum bag life and economy is assured.

The technique is being utilized on dust collectors having glass cloth filter bags. The sound mechanism generates low-frequency vibrations which are transmitted to the bags at safe energy levels. Action produces no deflection, creasing, or fatigue of the bags. Quivering of bag is imperceptible to the eye, and all dust collected on inner bag surface is dislodged.

(Dust collectors incorporating sonic cleaning are product of Dracco Division of Fuller Co., 4063 E. 116th St., Cleveland 5, Ohio.)

Check 4059 opposite last page.

Rugged cell developed for pulp chlorination applications

Chlorination cell said to offer a practical approach to automatic control of chlorination has been developed. Designed for pulp applications, unit has rugged sensing element that resists physical and chemical environments existing in pulp chlorination processes.

Cells are available in two models, a probe unit for large vessels and a flow-through unit for line applications. Both are constructed of epoxy material which permits direct placement in stock flow of pulp systems.

Cell is said to offer three major advantages over conventional units: 1) It reduces number of cell inspections and downtime of automatic control system, 2) bridging of pulp fibers between electrodes is eliminated, and 3) installation as regards to piping and auxiliaries is simplified.

Better control of pulp chlo-

See why ALCOA ALUMINUM makes a good design habit

Requirement: Low-cost, corrosion-resistant heat exchanger material

Key to Good Design: Specify Alcoa Aluminum Tube and Sheet

If corrosion resistance, long life, product purity and economy are considerations in your heat exchanger application, specify aluminum! ALCOA® Aluminum has been solving such problems for over 40 years.

In the petroleum industry, ALCOA Aluminum Tubes serve in main column overhead condensers where their freedom from fouling and excellent heat transfer properties have made them a natural selection. Heat exchangers made of ALCOA Aluminum Tube and Plate are used in the production of ammonia, nitric acid, vegetable oils, naval stores, naphthalene, hydrogen peroxide, oxygen and urea. These and other processes call for heat exchangers with combinations of high strength, excellent sub-zero physical qualities, high thermal conductivity, or nontoxic and noncatalytic properties. ALCOA Aluminum alloys meet all these requirements.

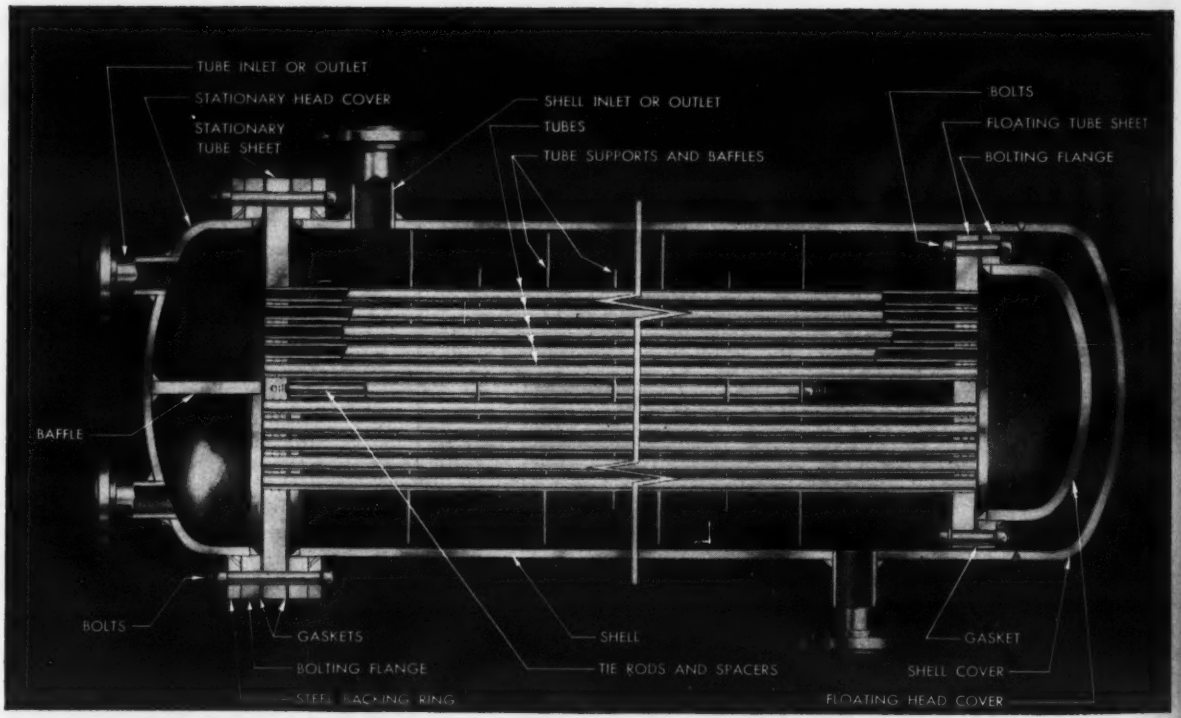
As for cost, ALCOA Aluminum Tube is the most inexpensive. In the common sizes it costs one-third less than mild steel, one-half as much as admiralty, and one-fifth that of stainless.

ALCOA Aluminum alloys are ideally suited to a wide range of maintenance methods. For relatively soft or loose scale, water jets and brushes are usually satisfactory. Wet sandblasting as well as chemical cleaners may be used effectively.

ALCOA engineers have worked closely with all segments of the process industries for over 40 years, and can help you specify the aluminum alloy best suited to your heat exchanger and other process applications. ALCOA's unparalleled experience in this field is available to you for the asking. Write to the address on the coupon, stating your requirements as specifically as possible. ALCOA's development engineers will welcome the opportunity to work with you on your problems.

You can also take advantage of the wide selection of free ALCOA literature on aluminum for heat exchangers and other process applications. Simply check the booklets you want on the coupon and mail to the address indicated. ALCOA will forward your material promptly and without obligation.

ALCOA is conducting a series of engineering conferences on process industries applications of aluminum during 1959 in a number of major cities. Contact your nearest ALCOA sales office for full particulars and dates.

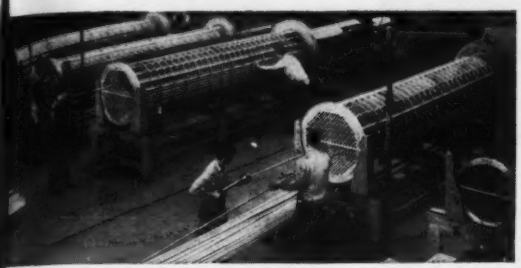


For certain processes where corrosive or sensitive materials are involved, it is often advisable to use aluminum for entire heat exchanger systems to avoid system corrosion and contamination of the product. A typical all-aluminum heat exchanger is shown here. Alloy recommendations are given in the table opposite.

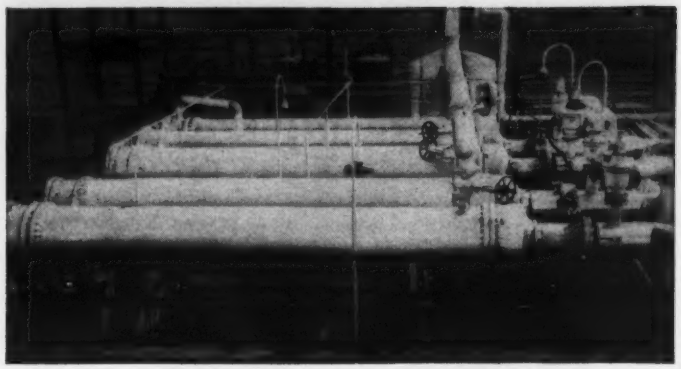
Alcoa Aluminum Tubing protects color in the world's largest rotary steam-tube drier. The drier measures 10 ft in diameter by 100 ft long.

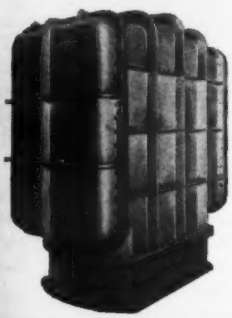
A Midwest utility saved 50 per cent on tubing costs by using Alcoa Aluminum instead of admiralty for tubing in this surface condenser. Successful operation of this unit has led to the installation of similar units by other utilities. This use demonstrates aluminum's economy and superior resistance to ammonia, carbon dioxide and hydrogen sulfide.

A battery of all-aluminum heat exchangers in a polyethylene plant. Selected for initial low cost, these aluminum exchangers provide freedom from product contamination as well as desirable low temperature properties.



Construction of a heat exchanger utilizing Alcoa Aluminum Tube. Superior working properties plus the cold-drawing method by which Alcoa seamless heat exchanger tubes are produced results in close dimensional tolerances and smooth inside and outside surfaces.



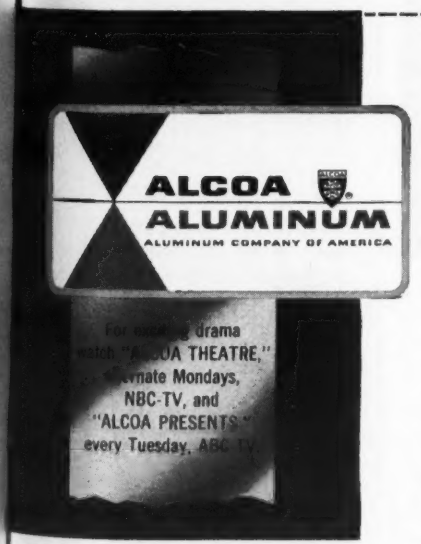


This all-aluminum dephlegmator in a large coke plant is used for the regeneration of ammonia liquor in a hydrogen sulfide scrubbing operation. Aluminum tubes lasted five times longer than steel tubes in a similar use.

Alloy Recommendations for Aluminum Heat Exchanger Construction

	Alcoa Designation	ASTM Specification*	Alloy
Tubes	3003-H14	B234	M1A
	Alclad (inside) 3003-H14	B234	clad M1A
	Alclad (outside) 3003-H14		clad M1A
	Alclad (both sides) 3003-H14		clad M1A
	6061-T6	B234	GS11A
	6062-T6	B234	GS11C
Tube Sheets	3004-H112	B178	MG11A
	Alclad 3004-H112	B178	clad MG11A
	6061-T6	B178	GS11A
	Alclad 6061-T6	B178	clad GS11A
Baffles	3003-H14	B178	M1A
	Alclad 3003-H14	B178	clad M1A
Tie Rods	6061-T6	B273	GS11A
Shells & Headers	3003-H112	B178	M1A
	Alclad 3003-H112	B178	clad M1A
	3004-H112	B178	MG11A
	5052-H112	B178	GR20A
	5154-H112	B178	GR40A
Fittings	3003-F	B274	M1A as applicable
	6061-T6	B274	GS11A as applicable
Flanges	6061-T6	B247	GS11A as applicable

*Only the basic number is shown since Alcoa products are manufactured to the latest issue of the specification. The complete number would indicate the year of issue.



Aluminum Company of America
872-J Alcoa Building, Pittsburgh 19, Pa.

Please send me the following literature covering Alcoa Aluminum in heat exchanger and other applications in the process industries.

- ☐ 10186 Alcoa Aluminum Heat Exchanger Tubes
- ☐ 20437 Aluminum Alloy Heat Exchangers in the Process Industries
- ☐ 10460 Process Industries Applications of Alcoa Aluminum
- ☐ 20849 Resistance of Aluminum Alloys to Weathering and Resistance of Aluminum Alloys to Chemically Contaminated Atmospheres
- ☐ 20272 Aluminum Alloys for Handling High Purity Water
- ☐ 20268 Resistance of Aluminum Alloys to Fresh Waters
- ☐ 20935 Designing to Prevent Corrosion

Name_____

Company_____

Title_____

Address_____

City_____

State_____

Check 4060 opposite last page.

rination in the bleaching process is also reported. Unit produces pulp of higher and more uniform quality and enables savings in the use of chemicals, says manufacturer.

(Diamond chlorination cell was developed by Electro Chemicals Division, Diamond Alkali Company, 300 Union Commerce Building, Cleveland 14, Ohio.)

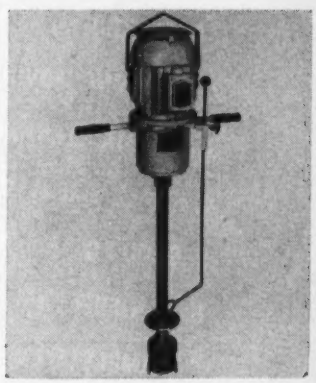
Check 4061 opposite last page.

Fast changing of motor and mixing head featured on unit

Uses: Dispersing, blending, and homogenizing.

Features: Mixing head can be powered with motors ranging from 2 to 10 hp, depending on requirement demanded by application. Motor and mixing head changes can be made in matter of minutes, minimizing downtime.

Description: Mixing head consists of two rotating impellers and two stationary stators enclosed within a cylindrical housing. Fine clearance between impellers and stators results in complete reduction



Mixer disperses, blends, and homogenizes fast and effectively

of agglomerates within mixture. All parts coming into contact with material being processed are manufactured of stainless steel and corrosion-resistant materials.

(Model RL Shear-Flow industrial mixer is product of Gabb Special Products, Inc., Windsor Locks, Conn.)

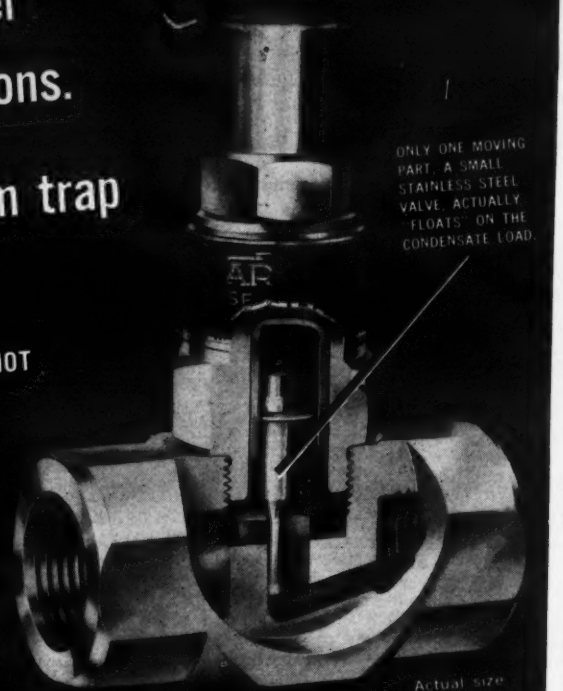
Check 4062 opposite last page.

YARWAY IMPULSE* is the only steam trap that continually samples fluid in the line to maintain condensate discharge close to steam temperature, eliminating condensate as soon as it forms.

Condensate seals the small control orifice against steam leakage under all normal operating conditions.

Here's why your best steam trap buy is Yarway Impulse—

1. GETS EQUIPMENT HOT FAST—AND KEEPS IT HOT
2. ONLY ONE MOVING PART
3. LOW MAINTENANCE
4. SMALL SIZE—LIGHT WEIGHT
5. GOOD FOR ALL PRESSURES
6. NON-FREEZING
7. COMPLETE LINE FOR EVERY REQUIREMENT



* A COMPLETE LINE OF STEAM TRAPS, ALL OPERATING ON A PROVEN THERMODYNAMIC PRINCIPLE

YARWAY impulse®

Manufactured by YARNALL-WARING CO., 125 Mermaid Ave., Philadelphia, Pa.
Stocked and sold by 125 Industrial Distributors
Write for free bulletin "The Why and How of Steam Trapping"

Check 4063 opposite last page.

Concentrations above 99% at 600-1000°F possible with continuous unit

Fast high-temperature dehydrations at low pressures

Uses: Dehydrating caustic and other materials requiring high evaporating temperatures.

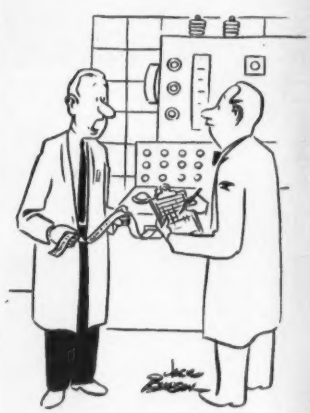
Features: Unit can operate continuously, handling products requiring temperatures from 600 to 1000°F, in final concentrations above 99%.

Description: High-temperature, single-pass, continuous concentrator provides new avenues of approach to high-temperature dehydration. Unit is adaptable to either molten salt or direct-fired heating methods. Concentrator is completely enclosed, minimizing chances of contamination.

Operating results obtained from preliminary installations have shown that unit operates at low atmospheric pressure, has high-transfer efficiency, and that it can be designed to fit wide range of production needs. Materials of construction range from carbon steel to Inconel, nickel, stainless steel, and other alloys.

(Continuous concentrator is development of Buflovak Equipment Division, Blaw-Knox Company, P. O. Box 2041, Buffalo 5, N. Y.)

Check 4064 opposite last page.



"The 'brain's' reply is, 'Deposit 50c for the next five minutes, please.'"

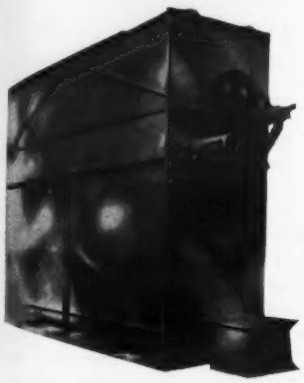
Capacities up to 310 cu ft handled efficiently by surge bin

Mixed continuously with horizontal mixer

Uses: Continuously mixing solid bulk materials.

Features: Capacities up to 310 cu ft can be handled when used with 3-ton mixer.

Description: Surge bin, used in conjunction with manufacturer's horizontal mixer, provides maximum mixing capacity for amount of space used. Unit bolts directly to mixer frame, and is joined to sides of mixer by



Surge bin provides maximum mixing capacity for amount of space used

metal panels. Heavy-duty screw conveyor can be driven from a mixer rear shaft extension. If desired, device can be equipped with separate drive.

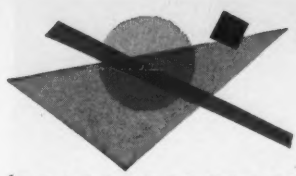
Three gates operated by single air cylinder provide quick discharge from mixing unit into surge bin. Large 20" x 20" inspection door simplifies maintenance.

(Marion surge bin is product of Rapids Machinery Company, Marion, Iowa.)

Check 4065 opposite last page.

Centrifugals, including a super-suspended model which can achieve 1600 rpm (1750 G's), are treated in Centrifugal Literature — Centrifugal Division, The New Fletcher Works, Inc., 201 Glenwood Ave., Philadelphia 40, Pa.

Check 4066 opposite last page.



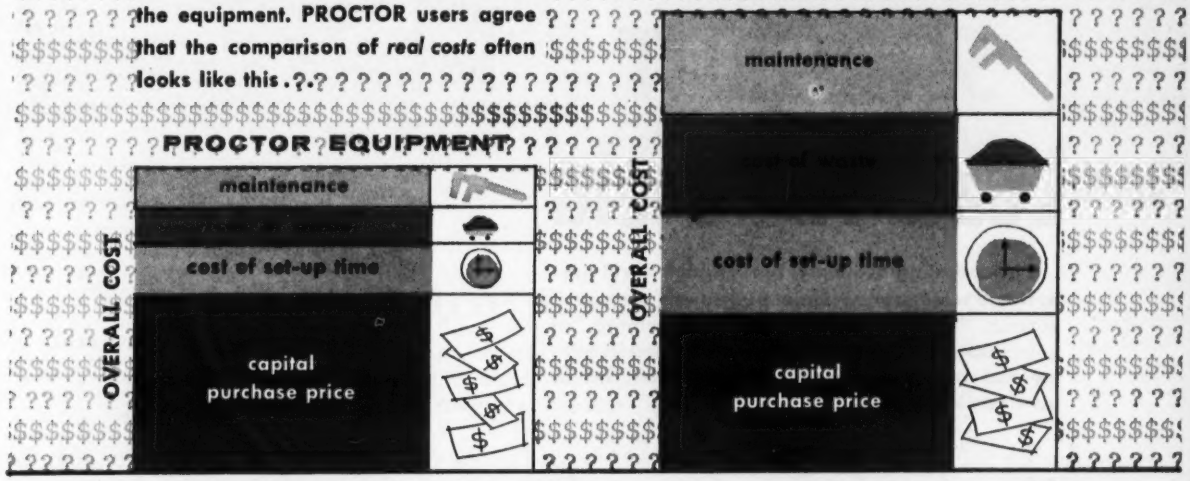
MODERNIZING WITH NEW EQUIPMENT?

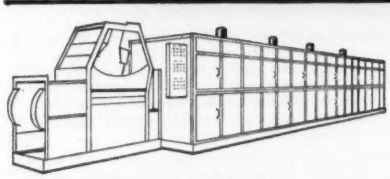
what will the REAL cost be?

REAL COST =

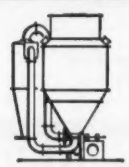
CAPITAL COST
+
INSTALLATION COST
+
AVOIDABLE WASTE
+
MAINTENANCE
+
DELAYED PRODUCTION

The purchase price can be the least of these over the years you will operate the equipment. PROCTOR users agree that the comparison of *real costs* often looks like this . . .

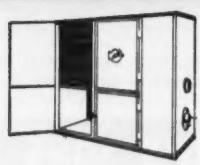




CONVEYOR DRYERS



SPRAY DRYERS



TRAY DRYERS

TRUCK DRYERS

Write for bulletin #443.

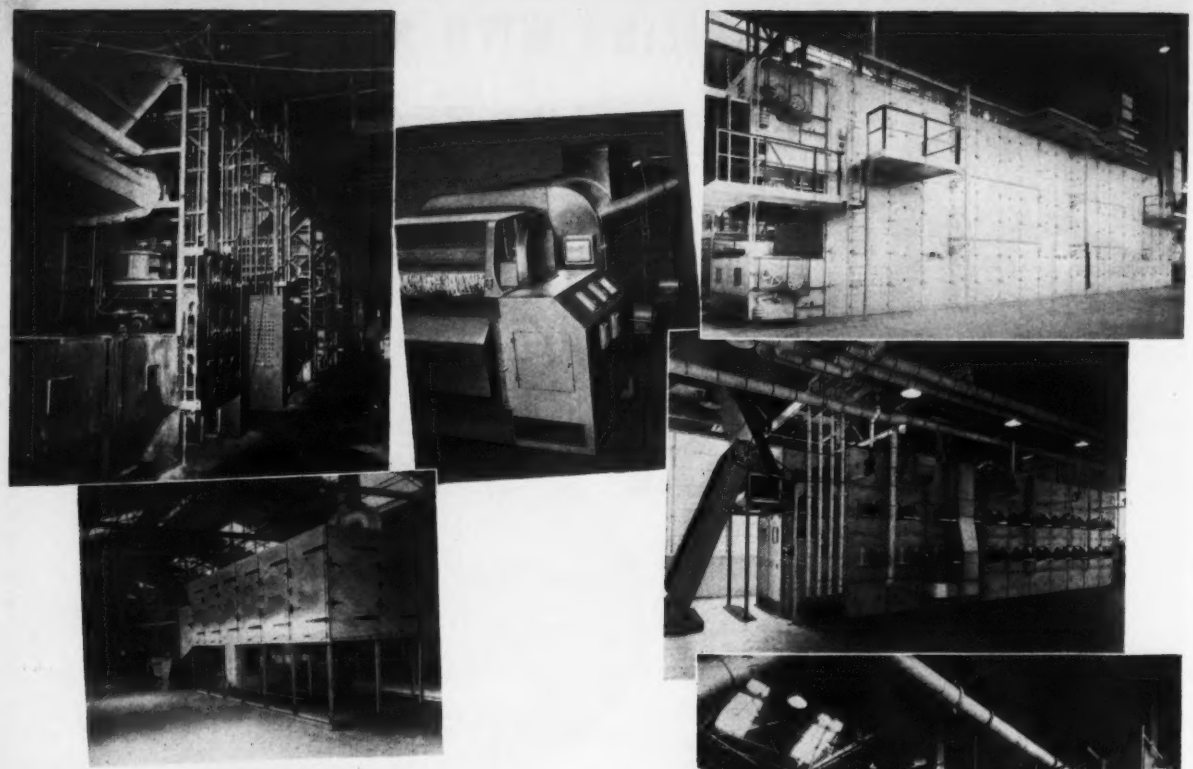
See our insert in Chemical Engineering Catalog.

Proctor & Schwartz will be happy to show you how buying Proctor equipment will cost you less.

Proctor®

PROCTOR & SCHWARTZ, INC.
PHILADELPHIA 20, PA.

Check 4067 opposite last page.



DRYERS *by* SARGENT Lead The Field

. . . in operating economy; proven high-level production; minimum of maintenance requirements; easiest, quickest cleanout; dependability of guaranteed performance; fastest installation with erection costs the lowest on the market. Let us give you details.

DRYERS (Conveyor, Tray, Truck, Pole, Tunnel, Laboratory, Pilot Plant)
COOLERS • FEEDERS • EXTRUDERS • GRANULATORS

C. G. SARGENT'S SONS CORPORATION
Graniteville, SINCE 1852 Massachusetts

PHILADELPHIA • CINCINNATI • ATLANTA • CHARLOTTE • HOUSTON • CHICAGO • DETROIT • TORONTO

Shown above are some installations of Sargent Dryers at work in one division of the chemical process industries — Synthetic Rubber. Pictured clockwise are:

BALE DRYER — A completely new design developed in cooperation with the company's engineers. Steel frame. Aluminum panels. Gas-fired. High quality production. United Rubber and Chemical Company, Baytown, Texas.

BANK OF FOUR SYNTHETIC RUBBER DRYERS — Each is 3-pass, gas-fired, with coolers an integral part of the machine. Goodyear Tire and Rubber Company, Houston, Texas.

PILOT PLANT DRYER WITH EXTRUDER and Cooling Section — Remarkably compact and efficient. Each section with individual motor and fan. Uses 1.2 lbs. of steam to each pound of moisture removed. A widely-known chemical company.

3-PASS GAS-FIRED DRYER — believed to be the largest such machine ever built. Note hinged, full height doors for complete accessibility to entire interior. Uses only two gas burners for heat source, with working temperature attained in less than 10 minutes from startup. Polymer Corporation Limited, Sarnia, Canada.

DRYER AND COOLER — High volume production. Crumb leaves cooler (in-built as part of the machine) ready to bale. Has special Sargent-designed breaker to keep crumb flowing freely. Many other exclusive features. A large rubber and chemical company.

FOUR SARGENT DRYERS for England's first general purpose (bulk) synthetic rubber plant. Built under Sargent license by L. A. Mitchell & Co., Manchester, England. International Synthetic Rubber Company Ltd., Hythe, Southampton.

Check 4068 opposite last page.

Mill's cooling action eases processing of heat sensitives

Unit can handle up to 5000 lb material per hour

Uses: Extremely fine grinding of soft, nonmetallic materials in capacities up to 5000 lb per hour.

Features: Design permits processing of numerous heat-sensitive materials. Whirling air provides cooling action. For materials with extreme heat sensitivity, refrigerated air or inert gas may be introduced.

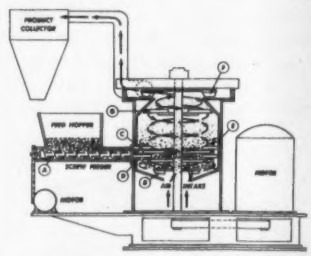
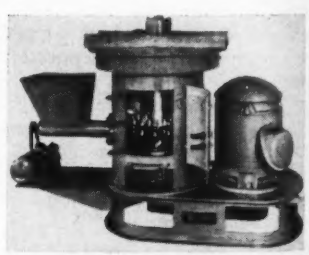


Diagram illustrates flow of material through mill. Cooling air permits processing of heat sensitive materials

Description: Referring to diagram, raw material is fed through variable-rate screw feeder (A) and is pulled into pulverizing zone by whirling vertical air flow created by vanes (B and G). In grinding zone, revolving hammers (C and D) impact product against stationary wall hammers and housing walls. Deflector wall construction (E) bounces larger particles back into grinding zone.



All moving parts on vertical mill can be easily reached for inspection

Pulverized fines are pulled upward through revolving

centrifugal selector arms (F) by whirlwind exhaust fan. Only particles of desired fineness are blown to the collector.

Particle size is controlled by number of selector bars and rate of feed and vertical air flow. Six to twelve selector bars are normally used. Extra blades are provided if required. All moving parts are easily accessible for cleaning, inspection, or maintenance. For products having tendency to adhere to steel, unit may be rubber-lined. Liners are replaceable.

(Sturtevant Pulver-Mill is product of Sturtevant Mill Company, Dorchester, Massachusetts.)

Check 4069 opposite last page.

Combination synthetics well suited for tough filter applications

Exhibit good cake discharge, abrasion resistance

Uses: Filtering various materials in chemical and allied industries.

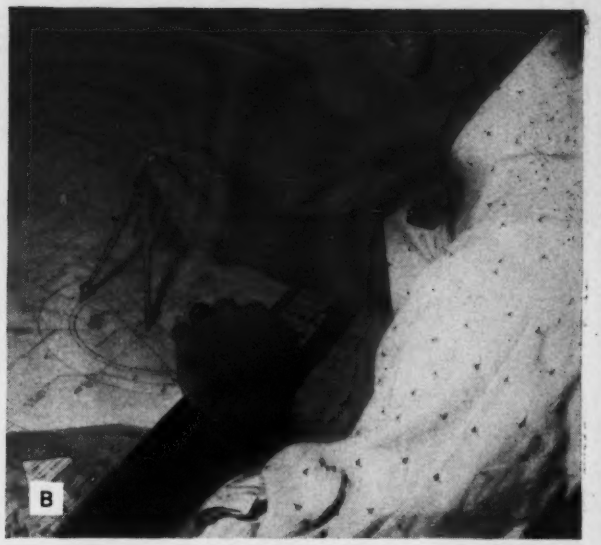
Features: Fabrics are tough and rugged, are designed to be used in difficult filtering applications.

Description: Fabrics consist of such synthetics as linear polyethylene and PVC, together with spun or staple filling yarns as dynel and orlon. Combination unifies high strength of plied continuous filament warp yarns with cover and rententivity advantage of spun or stapled yarn in the filling direction. Resultant product exhibits good cake discharge and top abrasion and chemical resistance.

Test samples are available of such combinations as: PVC-dynel, linear polyethylene-dynel, and linear polyethylene-orlon. Future fabrics now in the development stage include combinations of the above-mentioned synthetic materials and polypropylene.

(Combination fabrics are product of The National Filter Media Corporation, New Haven, Conn.)

Check 4070 opposite last page.



Where skillful hands work for you

Craftsmanship follows through on every stage of the design and fabrication of pressure vessels and heat exchangers at Downingtown Iron Works. Come and see for yourself. Inspect our shop procedures on work in normal progress. Or write for helpful Bulletins HE and CI.

A **On the nose**—Accurate fit-up...a second check after tack welding...another before shipment...assure nozzles are on the nose, save installation headaches.

B **Detailing your ideas**—in language the shop man understands—means that equipment fabricated here carries out your plans, meets your process requirements.

C **"X" marks the spot**—and punch mark guides true center of tube hole...holds close ligament tolerances...assures accurate tube sheets and efficient operation.

D **A Downingtown extra**—Back-chipping nozzle weld assures sound weld metal through and through...is one of the DIW extras that go beyond code requirements.

Downingtown Iron Works, Inc.

144 Wallace Ave., Downingtown, Pennsylvania

division of **PRESSED STEEL TANK COMPANY** Milwaukee

Branch offices in principal cities

HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION
CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS

DOWNINGTOWN IRON WORKS INC. Hackney

Check 4071 opposite last page.

"PAUL O. ABBÉ Pebble Mills produce finer compound than we were able formerly to achieve"

says manufacturer of plastic coated fabric.

A leading manufacturer of plastic coated fabrics recently installed Paul O. Abbe Pebble Mills, in a new plant. It uses these 6' diameter mills to mix and grind resins, plasticizers and pigments for vinyl coatings. The manufacturer states that the Paul O. Abbe Pebble Mills "produce a much finer compound than we were formerly able to achieve."

If you, too, are interested in

- **FINER GRINDING**
- **BETTER MIXING**
- **LOWER POWER AND MAINTENANCE COSTS**

Write today for catalog describing and illustrating Paul O. Abbe Mills

PAUL O. ABBÉ
GRINDING & MIXING EQUIPMENT
402 CENTER AVE. LITTLE FALLS, NEW JERSEY

PEBBLE MILLS	MASS & PASTE MIXERS
STEEL BALL MILLS	RIBBON MIXERS
JAR MILLS	BOTA-CONE BLENDERS
JAR ROLLING MILLS	BOTA-CONE VACUUM DRYERS

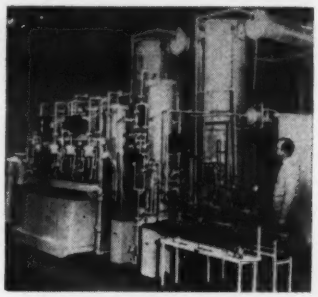
Check 4072 opposite last page.

Ultra-pure water produced in large quantities by equipment

Uses: Producing 18 million-ohm water in production quantities.

Features: Equipment is capable of turning out high-purity water, free of bacteria, organics, silica, and submicroscopic particles.

Description: Water purification equipment consists of sand and carbon filter for preliminary treatment of water, a four-bed demineralizer for removing most ionizable impurities, and two stills for removing non-ionizable suspended gaseous products.



Purification equipment can turn out 18 million-ohm water in production quantities

Also included is box-type, tin-lined tank for intermediate storage. A mixed-bed particles down to 0.45 micron. demineralizer takes out final traces of ionizable impurities. Submicron filter can remove Final heating of water to desired temperature is accomplished by tin-lined heater.

(Water purification equipment is product of Barnstead Still and Sterilizer Company, 239 Lanesville Terrace, Boston 31, Massachusetts.)

Check 4073 opposite last page.

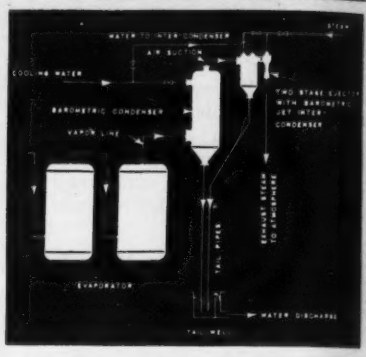
Glass heat exchangers are compact, strong, easy to install

Uses: Heating and cooling liquids and solutions.

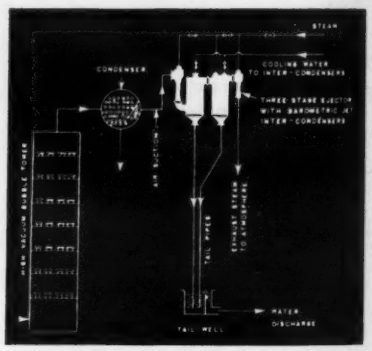
Features: Glass heat exchangers have high heat transfer efficiency and mechanical strength. A 60 square foot unit

Here's how to get high vacuum at lower cost... from

C. H. WHEELER



In Evaporation, C.H. Wheeler Tubejet® Ejector works with Wheeler Barometric Condenser in flow diagram above to produce high vacuum. Initial cost of Ejector is low and installation is easy because of light weight and simple connections.



In Refining Operations, diagram above shows how to create high vacuum in bubble tower. Three-stage Tubejet Ejector draws off exceptionally large volumes of gases, vapors. Absence of moving parts and use of corrosion-resistant materials (stainless steel, bronze, cast iron) result in very low maintenance costs. Many Tubejets, in fact, have operated more than 35 years without major replacement of parts!

FREE! 35-page catalog showing flow diagrams for many efficient, money-saving vacuum operations. Ask for Catalog 1462.

Process Equipment Division

C. H. WHEELER MFG. CO.

19th and Lehigh Avenue • Philadelphia 32, Pa.

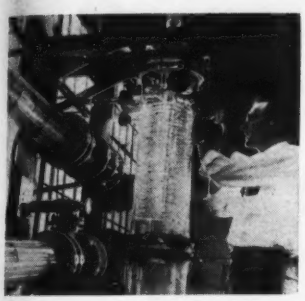
Steam Jet Vacuum Equipment • Centrifugal, Axial and Mixed Flow Pumps
Steam Condensers • Marine Auxiliary Machinery • Nuclear System Components

Check 4074 opposite last page.

occupies only 4.4 cubic feet of space and weighs about 94 pounds.

Description: Coil-type heat exchangers are compact, modular units, made of borosilicate glass. Glass shell surrounding the single tube coil can be easily joined to existing equipment. Monolithic construction prevents leaks in high vacuum and pressure applications.

Heat exchangers can be operated in parallel or series. Because of their relatively light weight and small size,



All-glass, coil-type heat exchanger has 60 sq ft capacity, occupies only 4.4 cu ft space, and weighs about 94 lb

they can be installed directly on top or below operating equipment without use of cranes. Units vary in size from 2½ to 60 square foot capacities.

(Further information about QVF coil-type glass heat exchangers may be obtained from Plant Equipment Sales Dept., Corning Glass Works, Corning, New York.)

Check 4075 opposite last page.

Electrolytic cells for chlorine-caustic plants are topic of revised eight-page bulletin. General operating performance and description of Hooker type-S Cells are specified in Bul 20-A — Hooker Chemical Corporation, Box 344, Niagara Falls, N. Y.

Check 4076 opposite last page.

Horizontal filters are subject of four-page bulletin which includes schematic drawings. Bul NH-122-1155 — Industrial Filter & Pump Mfg. Co., 5900 Ogden Ave., Chicago 50, Ill.

Check 4077 opposite last page.

EASY SEPARATION

Another Advantage of SANDVIK Steel-Belt Coolers

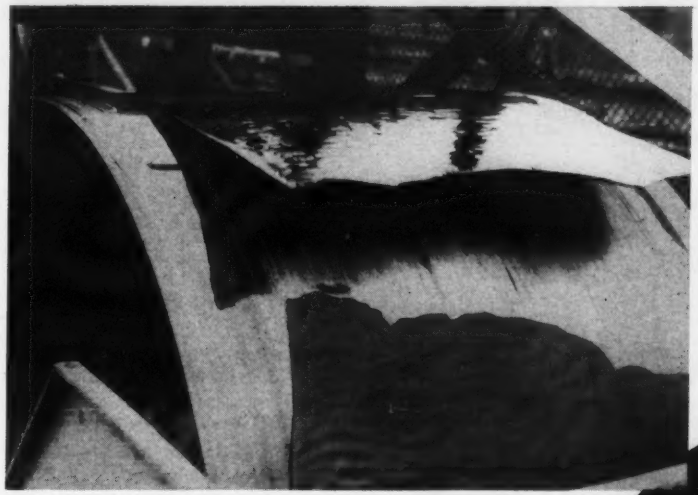
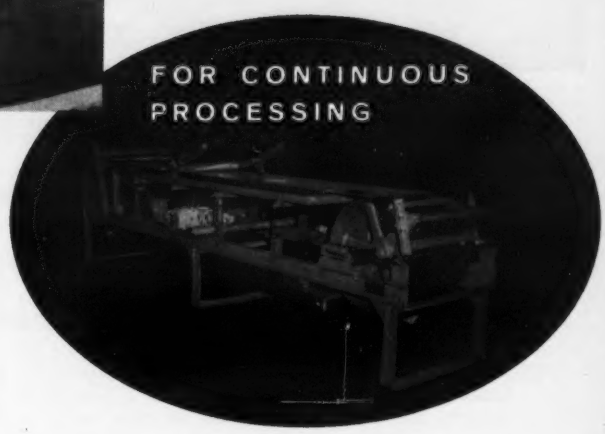
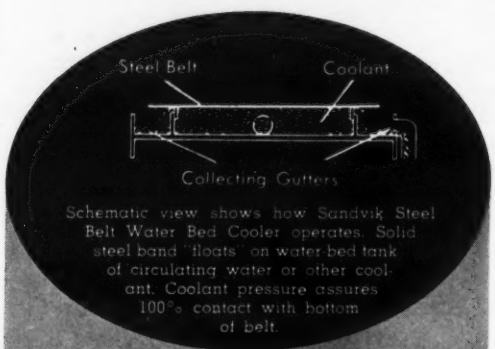


Photo shows how most materials cooled and solidified on the flat, horizontal surface of Sandvik steel belt separate easily at point where belt curves around pulley, even without the use of scraper blades.



Easy separation is just one of the many advantages that the Sandvik steel belt cooler provides for continuous processing of hot chemicals.

This patented unit is being successfully used to cool a wide variety of materials with feed temperatures up to 1900° F. On some applications capacities range as high as 25 tons per hour. It is used to cool and convey, regulate thickness while cooling, control temperatures in specified zones along the belt, cool materials in layers, cool loose materials, cool and strip off gelatinous materials in sheet form and many other operations. The belt can be hooded for humidity control of hygroscopic materials. Crystalline materials can be seeded or agitated on the belt at the correct temperature zone.


Steel Belt
Coolant
Collecting Gutters
Schematic view shows how Sandvik Steel Belt Water Bed Cooler operates. Solid steel band "floats" on water-bed tank of circulating water or other coolant. Coolant pressure assures 100% contact with bottom of belt.

SOME TYPICAL EXAMPLES OF MATERIALS BEING COOLED ON SANDVIK WATER-BED COOLERS

Aluminum Sulphate	Resins:
Ammonium Nitrate	(Hydro Carbon
Asphalt	Epoxy
Coal Tar Pitch	Vinyl
Chlorinated Wax	Synthetic
DDT	Wood Rosins)
Gelatine	Sodium Metasilicate
Maleic Anhydride	Sulphur
Phosphate Glass	TNT
Phtalic Anhydride	Triphenol Phosphate
Polyethylene Wax	Zinc Nitrate
	And Other Materials

Sandvik can supply cooling data on a wide range of materials. Sandvik also has portable, experimental cooling units available on which you can make small scale trials in your plant. Write or phone for further details.

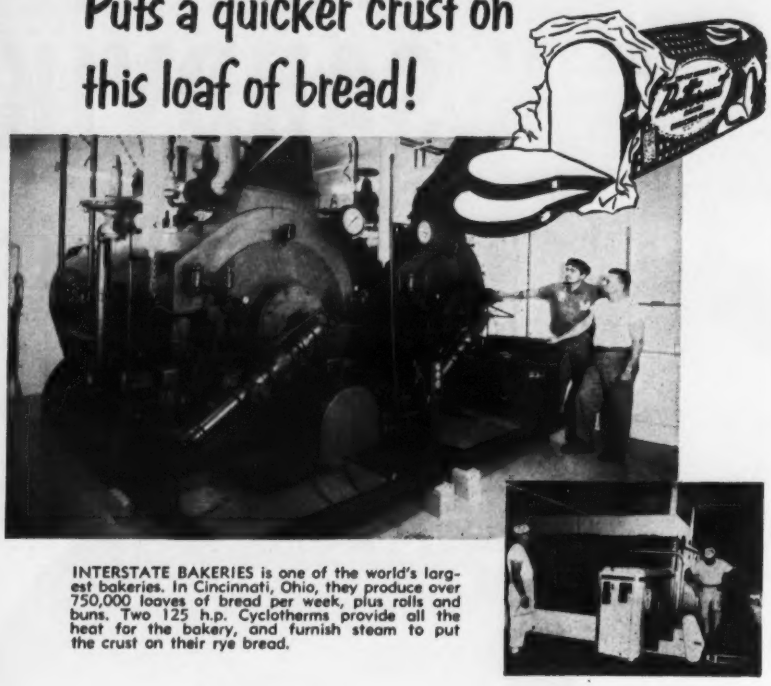
SANDVIK STEEL, INC.
Steel Belt Conveyor Department
1702 Nevins Road, Fair Lawn, N. J.
SWarthmore 7-6200
Cleveland • Detroit • Chicago • Los Angeles
IN CANADA:
Sandvik Canadian Ltd., P.O. Dr. 1335, Sta. O., Montreal 9, P. Q.

SANDVIK STEEL BELT CONVEYORS

Check 4078 opposite last page.

CYCLOTHERM

Puts a quicker crust on this loaf of bread!



INTERSTATE BAKERIES is one of the world's largest bakeries. In Cincinnati, Ohio, they produce over 750,000 loaves of bread per week, plus rolls and buns. Two 125 h.p. Cyclotherms provide all the heat for the bakery, and furnish steam to put the crust on their rye bread.

. . . all the steam needed, at lower cost, in less space!

Interstate Bakeries, like many other processing plants, have found that Cyclotherm Package Steam Generators provide the capacity and flexibility to handle *all* their steam needs. Only one of the two 125 h. p. Cyclotherms is commonly in use . . . operating at peak efficiency. The other comes into use under peak demands . . . such as when providing steam to crust the bakeries' rye bread.

Because of compact design . . . Cyclotherms save up to 1/3 the space required by conventional boilers . . . the two 125 h.p. package generators fit easily into existing room.

Cyclotherm begins saving money even *before* they go to work. They require no expensive foundations or stacks. Only five simple connections, and installation is complete.

Interstate Bakeries report that maintenance of their two Cyclotherms is practically nothing. The two steam generators are in constant service except for 15 minutes each day when the boilers are blown down and water treatment is checked.

Cyclotherm Package Steam Generators are available with oil and/or gas burners to permit you to take advantage of the best fuel prices in your area. In addition, the patented principle of Cyclonic Combustion with Perfect Diffusion Burning consumes *all* the fuel . . . provides a minimum of 80% efficiency from only two passes.

YEARS AHEAD IN STEAM & HOT WATER GENERATION CYCLOTHERM

A Division of National-U.S. Radiator Corp.
60 E. First St., Oswego, N. Y.

Clip to Your Letterhead

60

Please send me complete information on Cyclotherm Package Steam Generators used in Bakeries and Food Processing Plants.

Check 4079 opposite last page.

Waste treatment equipment is discussed in 20-page book. Flow diagrams illustrate how units are installed in typical water, sewage, and industrial waste treatment plants. Equipment includes screens, mixers, grit collectors, washers, and sludge collectors. Book 2617 — Link-Belt Company, Dept PR, Prudential Plaza, Chicago 1, Ill.

Check 4080 opposite last page.

Particle size table in handy pocket-size form shows relationship between particle diameter measurements in fractions of inches with U.S., Tyler, and British screen sizes. Table covers range from 1 to 2000 microns. Particle Size Table — Schutz-O'Neill Co., 311 Portland Ave., Minneapolis 15, Minn.

Check 4081 opposite last page.

Wide flexibility featured in manufacturer's line of turbine agitators

Uses: Mixing various materials in chemical and allied industries.

Features: Five basic gear-drive configurations are available in sizes through 75 hp: right-angle head, belt driven, in-line with coupled motor, in-line with integral motor, and variable speed.

Description: Manufacturer's line of turbine agitators are designed for wide flexibility. Each gear-drive configuration is built in seven basic case sizes, with choice of any AGMA gear ratio, and choice of

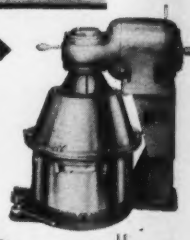
Gears in turbine agitator drive are flame-hardened chrome-moly steel with teeth ground after hardening for quiet operation

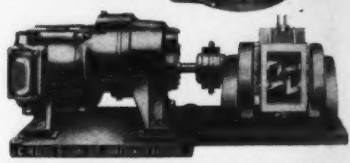
RESEARCH & DEVELOPMENT

REQUIRES THE BEST MIXING, GRINDING & DISPERSING EQUIPMENT

#130EL—2 qt. variable speed Double Planetary Change Can Mixer—1 qt. — 150 gal. sizes.

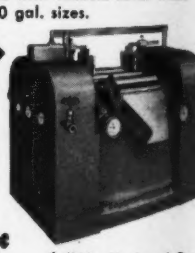
#130EL — 1 gal. vacuum tight Mixer. Available with stainless steel seamless jacketed cans and up to 1 HP exp. prf. motor drive.

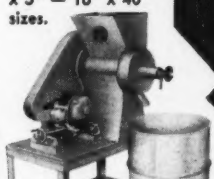




#41A—1 Pt. Double Arm Kneader. Easy to clean, jacketed, and with vacuum cover when required. 1 Pt.—150 gal. sizes.

#52LC—4½"x10". Three Roll Mill with water cooled rolls, one point adjustment and quick roll release. 2½" x 5" — 16" x 40" sizes.





#70—H size 4 Dry Grinding Mill Variable speed drive, with 1" feed size ground between ⅛" and #100 mesh as required. Many sizes including other type Disintegrators, Crushers and Pulverizers.

#140DL — High Speed Disperser with specially designed multiple action Millhead. Variable speeds up to 8000 FPM produce tremendous impact, abrasion and hydraulic shear. Laboratory or production sizes.

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Check 4082 opposite last page.

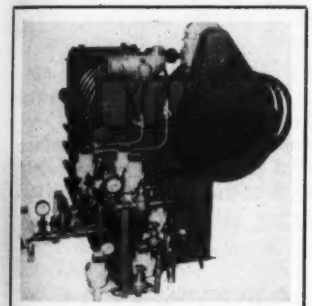
three mountings for open and closed tanks.

Gears are flame-hardened chrome-moly steel with teeth ground after hardening for quiet operation. Shaft is rigidly supported by closely-spaced spherical and tapered roller bearings. Lubrication of all moving parts in gear case is provided by positive oil pump. Dry-well seal prevents leakage.

Parts coming into contact with product being processed are available in various materials and construction. Standard impellers come in three styles: straight, curved, and 45°-pitched blade.

(Moduflex turbine agitators are product of Chemineer, Inc., 1044 East First St., Dayton 2, Ohio.)

Check 4083 opposite last page.



Automated plate-frame filter . . .

. . . is a 32" diam, eight frame unit, to be used in liquids-solids separation process involving recovery of a valuable metal. A fully-automated version of the improved Eimco-Burwell filter, the unit is equipped with electric timing control circuit and auxiliaries for automated operation on multi-cycle basis. Unit is capable of ending one filtration cycle and starting another without the attention of an operator.

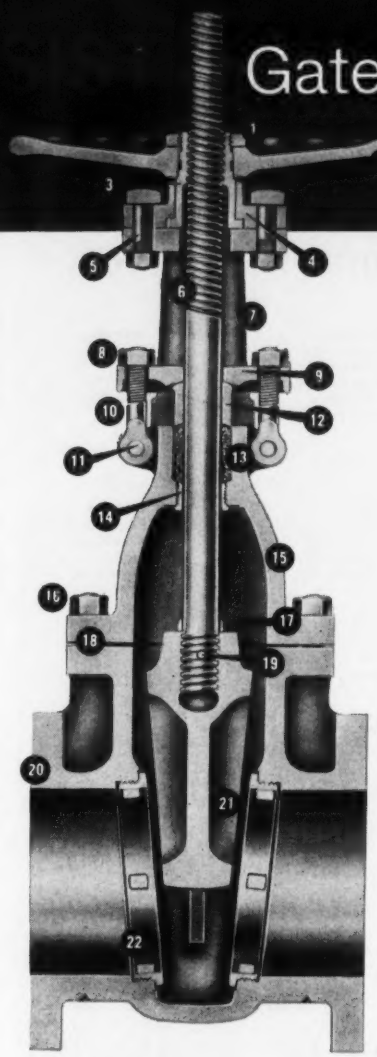
(Eimco-Burwell filter was built by Filter Division, The Eimco Corporation, P.O. Box 300, Salt Lake City 4, Utah.)

Check 4084 opposite last pg.

You extend valve life
in Corrosive and Erosive services
TWO WAYS when you

Specify for

Gate Valves, too



No. 1... when you specify "Jenkins" you get not merely "Ni-Resist" metal but you get Type 2 Ni-Resist Cast Iron! That affords extra resistance to acids, salt and alkaline solutions, sea water, brine and other corrosive and erosive fluids, vapors or gases. It is copper-free and will not contaminate or discolor the materials controlled.

Type 316 Stainless Steel is used for the wedge, spindle and other trimmings to give you a combination of metals which have remarkable ability to withstand destructive service.

No. 2... you get all the excellence which the Jenkins Diamond trademark has represented for nearly a century. The superior design and construction are visible here. Equally important superiorities which show up only in the records of long service and low maintenance are the close grain and high density of Jenkins castings . . . the precision of Jenkins machining . . . the rigid inspection and testing which every Diamond-marked valve undergoes.

It costs no more to buy Ni-Resist Gates made by Jenkins. And, it may cost much less to USE them. Write us, or ask your Jenkins Distributor for information folder No. 205.

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3 Bronze yoke bushing
4 Iron yoke cap with zerk fitting for lubricating bushing
5 Steel yoke cap bolts and nuts
6 TYPE 316 STAINLESS STEEL spindle
7 NI-RESIST CAST IRON, TYPE 2, yoke
8 Bronze eye bolt nuts
9 Malleable iron gland flange
10 Steel gland eye bolts
11 Steel gland lug bolts and nuts
12 TYPE 316 STAINLESS STEEL gland
13 Teflon impregnated asbestos packing
14 TYPE 316 STAINLESS STEEL bonnet bushing
15 NI-RESIST CAST IRON, TYPE 2, bonnet
16 Steel bonnet bolts and nuts
17 TYPE 316 STAINLESS STEEL spindle ring
18 Asbestos gasket
19 TYPE 316 STAINLESS STEEL wedge pin
20 NI-RESIST CAST IRON, TYPE 2, through-port body
21 TYPE 316 STAINLESS STEEL solid I-beam wedge
22 TYPE 316 STAINLESS STEEL seat rings

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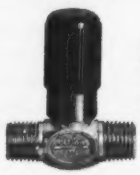
Bar Stock Valves to handle high pressures


Packless Valves to resist corrosion, hold high vacuum

Metering Valves to throttle down to a trickle

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HOKE

Check 4086 opposite last page.

recent books

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Welding of Plastics

Reviewed by
W. F. Bartoe
Rohm & Haas Co.
Research Division
Bristol, Pa.

"Welding of Plastics," by J. A. Newmann and F. J. Bockhoff of the American Agile Corporation, is a very readable 279-page treatise replete with 66 good pictures, 92 drawings and graphs, 43 tables and three appendices. The thirteen chapters cover all phases of the subject, from historical background to details of engineering and fabrication.

Appendix III on "Chemical Resistance of Some Weldable Thermoplastics" is the most useful compilation of this type that the reviewer has seen.

To obtain "Welding of Plastics," remit $7.25 direct to Reinhold Publishing Corporation, 430 Park Avenue, New York 22, New York.

Collective Bargaining Viewed by Unorganized Engineers and Scientists

This book is another one of a series written by John W. Riegel, Professor of Industrial Relations, University of Michigan. It is based on a study conducted by the school's Bureau of Industrial Relations at 10 companies — eight industrials and two public utilities.

The 105-page work presents the answers of 264 non-supervisory engineering and scientific employees to the question: "What is your opinion of collective bargaining for professional employees?"

The six chapters include arguments for collective bargaining and unionization, arguments for professional society action, objections to collective bargaining and unionization, and opinions about causes of unionization among scientific personnel. In addition to the report of the opinions given by the interviewees, the author adds his comments.

The book is well-written and is recommended for all those interested in this controversial subject. Although the actual sample of professional employees interviewed was quite small, opinions expressed are certainly representative of those in existence today. Interesting note: Only 27 of the 264 interviewees favored collective bargaining.

To obtain "Collective Bargaining as Viewed by Unorganized Engineers and Scientists," remit $4.00 to Bureau of Industrial Relations, The University of Michigan, Ann Arbor, Mich.

Check 4087 opposite last page.

Theoretical Principles of Organic Chemistry

Reviewed by
D. S. Davis
University of Alabama

Volume 2 of Dr. Walter Huckel's "Theoretical Principles of Organic Chemistry" deals exhaustively with ten main topics: general physical properties; electrical properties of molecules; behavior of matter in alternating electric fields; relations between cohesion and constitution; ordered states; colloidal problems; chemical bonds; reaction velocity constant and constitution; and reaction velocity and equilibrium.

Of the 1046 pages, 39 in fine print are devoted to a subject index that includes many cross references, 71 constitute an excellent author index, and four present additions and

corrections to Vol 1. The 84 figures are nicely executed and the 148 tables are clear and uncrowded.

Many readers will appreciate Table 71 — which gives the formulas, melting points, boiling points, molecular refractions, exaltations, densities, refractive indices, and source references for 135 compounds — since many of these data are not readily available elsewhere.

Professor Rathmann, of the North Dakota Agricultural College, has achieved a smooth and idiomatic translation from the seventh German edition.

To obtain "Theoretical Principles of Organic Chemistry, Vol 2," remit $19 direct to D. Van Nostrand Co., Inc., 257 Fourth Ave., New York 10, New York.

Check 4088 opposite last page.

Nuclear Technology Process Chemistry

Reviewed by
SIGFRED PETERSON
Oak Ridge National Laboratory

This 579-page volume is an extremely valuable contribution to the literature of nuclear energy. It is a collection of papers on many chemical and chemical-engineering aspects of nuclear technology edited by F. R. Bruce of Oak Ridge National Laboratory, J. M. Fletcher of Harwell, and H. H. Hyman of Argonne National Laboratory.

The papers are chosen from all areas of nuclear chemical technology except isotope separation. Result is the best single source of process chemistry and technology in the nuclear field. Combined with the older Volume 1, compiled by approximately the same team of editors, the coverage of the chosen field is complete.

Particularly noteworthy in this volume are: new solvent extraction methods for ore processing; first adequate presentation, on this level, of thorium technology; description of new American uranium conversion processes; first available publication of plutonium concentration and conversion chemistry; thorough treatment of preparation of irradiated reactor fuels for solvent extraction; and a 66-page summary of the tremendous practice and development effort in radioactive waste treatment.

Appendix contains valuable chemical and physical data pertinent to solvent-extraction processes.

To obtain "Progress in Nuclear Energy, Series III, Process Chemistry, Vol 2", remit $17.50 direct to Pergamon Press Inc., 122 E. 55th Street, New York 22, N. Y.

Check 4089 opposite last page.

Laboratory Distillation

Reviewed by
J. E. HAWKINS
University of Florida

"Laboratory Distillation Practice," a 166-page book by E. A. Coulson and E. F. G. Herington, British authors, covers material in a manner not found elsewhere in a single volume.

Extractive and azeotropic distillation and the theory and practice of ordinary fractional distillation at atmospheric and reduced pressures are clearly presented. Included are numerous illustrations of equipment, excellent sample calculations for use in evaluating characteristics of fractionating columns, diagrams of auxiliary electrical circuits, and pressure-control systems.

Among helpful and novel suggestions are use of asbestos spacers and a method of arc-welding thermocouple wires. Detailed directions for measuring column characteristics are excellent, as is the description of the method for testing liquid-vapor equilibrium data for thermodynamic consistency.

To obtain "Laboratory Distillation Practice," remit $4.50 direct to Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York.

Check 4090 opposite last page.

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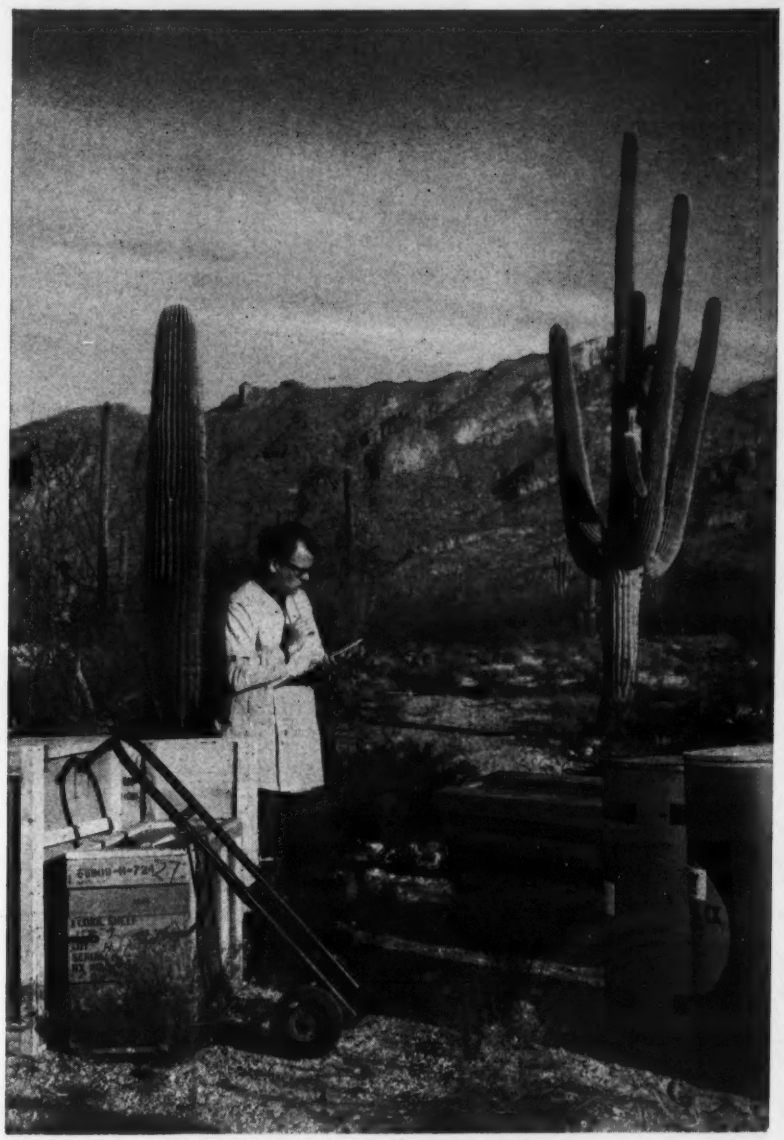
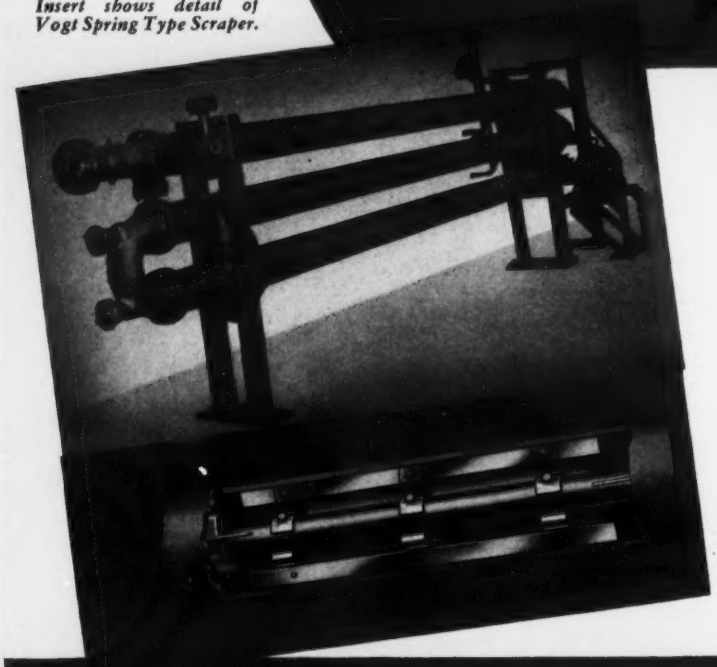


Lectrodryer® McGRAW EDISON

Check 4091 opposite last page.

Vogt Solve EXCHANGERS Heat Transfer and Crystallization Problems . . .

BELOW: *A scraped surface unit for production of Para-Xylene by fractional crystallization. Insert shows detail of Vogt Spring Type Scraper.*



. . . And Here's How:

1. Rotating scraper action continuously sweeps surfaces clean even while processing highly adhesive materials.
2. Uniform rate of heat transfer keeps crystallization under control and discharges crystals as a slurry.
3. Product is thoroughly mixed by scraper blades as it flows.
4. Closed, pressure-type system permits use of flammable, volatile and expensive solvents with complete safety and no solvent loss.
5. Units fabricated from a broad range of materials to suit process stream characteristics.

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Listed here is a wide variety of materials which have been successfully processed with Vogt Scraped Surface Exchangers in the chemical, petro-chemical, petroleum and related industries.

Benzene Hexachloride
Caustic Soda
Caustic Potash
Clay
Cylinder Stock
Para-Dichlorbenzene
Fatty Acid Solutions
Fish Oil
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Phenolic Resins
Polyester Liquid
Pressed Distillate
Reduced Petroleum
Waxy Oil-Solvent Mix
Soybean Oil
Sperm Oil
Sugar Syrup
Sulfur-Oil Mix
Sulphate Solution
Tall Oil-Naphtha-Sulfuric Acid Solutions
Tetrachloro Benzene
Viscose
Wax Slurry
Para-Xylene

HENRY VOGT MACHINE CO.
Louisville 10, Ky.

Check 4092 opposite last page.

RECENT BOOKS

Polymers and Resins

Reviewed by
ANDREW J. SNYDER
University of Alabama

This 744-page book is the work of Dr. Brage Golding, Director of Research, Lilly Varnish Company, and visiting professor of engineering at Purdue University. The author states in the preface that he had been searching "for an up-to-date text, not a treatise, which included the theory, chemistry, fabrication, and applications of polymeric and resinous materials."

The subject matter covers a wide range in the field of polymers, including fibers, elastomers, natural gums, and resins. Book includes 34 tables and 176 figures.

To obtain "Polymers and Resins," remit $15.00 direct to the D. Van Nostrand Company, Inc., 257 Fourth Avenue, New York 10, New York.

Check 4093 opposite last page.

Petroleum Chemistry and Refining

Reviewed by
D. S. DAVIS
University of Alabama

The editors of "Advances in Petroleum Chemistry and Refining," Dr. John J. McKetta Jr. and the late Dr. Kenneth A. Kobe, have undertaken to collect, annually, authoritative progress reports in a field important to our national economy. Common to each collection are five vital sections: economics and future trends, unit operations and design, refining processes, petrochemicals, and mechanical equipment.

This Volume II deals with the following topics covered by well-known experts: raw materials for the petrochemical industry, trends in lubrication, pebble heaters, radiation techniques, sulfuric acid alkylation of paraffins, coking petroleum residues, radiation processing, synthetic deter-

gents from petroleum, commercial production of hydrazine, and mechanical aspects of the Houdriflow catalytic cracking process.

In 634 pages, which include 141 excellent figures, 88 clear tables, 796 helpful references, and 22 pages of subject index, the editors and authors give most-lucid accounts of what research men and engineers have recently accomplished in petroleum and petrochemicals.

To obtain "Advances in Petroleum Chemistry and Refining, Vol II," remit $14.50 *direct to Interscience Publishers, Inc.,* 250 *Fifth Avenue, New York* 1, *N. Y.*

Check 4094 opposite last page.

Laminated Plastics

This 254-page book is a thorough survey of the manufacturing, fabrication, and applications of high- and low-pressure laminates. It covers the various types and grades of raw materials and resins used and their physical characteristics.

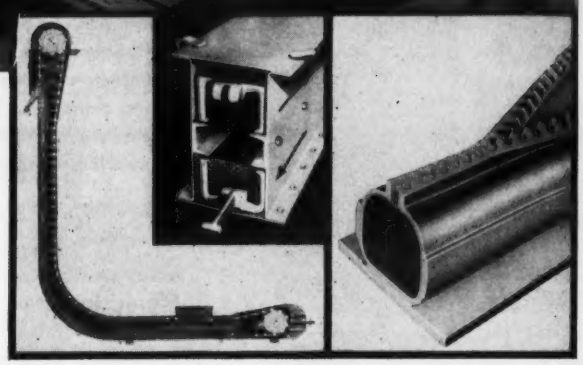
The volume is profusely illustrated with photographs and includes numerous tables of mechanical, chemical, and electrical properties as related to various kinds of industrial and consumer applications.

Authored by D. J. Duffin, Editorial Consultant, Continental-Diamond Fibre Corporation, Newark, Delaware, "Laminated Plastics" contains information and illustrations compiled from a great number of sources with the cooperation of many manufacturers. The appendix features an accurate and comprehensive list of laminated plastics manufacturers; trade names current in laminated plastics industry; and a glossary of basic laminated plastics terms.

This tenth book, as the others in the series, is semi-technical in nature. An extensive technical education is not required in order to understand the book's contents.

To obtain "Laminated Plastics," remit $5.75 *direct to Reinhold Publishing Corp.,* 430 *Park Ave., N.Y.* 22, *N.Y.*

STEPHENS-ADAMSON



S-A CONTINUOUS WEIGHER PROVIDES EXTREME ACCURACY!

The STEPHENS-ADAMSON Continuous Weigher weighs material continuously while in motion with extreme accuracy. Material entrance and exit points are in line with pivot axis of weigher providing for easy installation within existent processing operations and completely eliminating all discharge terminal errors. The unit handles hot material with equal accuracy. Minimum headroom is required. The weigher can be adapted with control equipment for accurate gravimetric feeding without requiring extensive plant alterations. STEPHENS-ADAMSON engineers will be happy to work with you on automating your processing operations.

S-A REDLER CONVEYOR

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S-A ZIPPER CONVEYOR

Literally a moving, material-carrying conduct, the zipper closed belt, conveyor-elevator is capable of transporting bulk materials in any plane, to considerable heights and around obstructions. Bulk materials are conveyed free of breakage, agitation or segregation within the sealed and dustight belt. The zipper combined with Continuous Weigher is ideal for automatic feeding operations. Request Bulletin 349.

WRITE FOR BULLETIN 958

S-A

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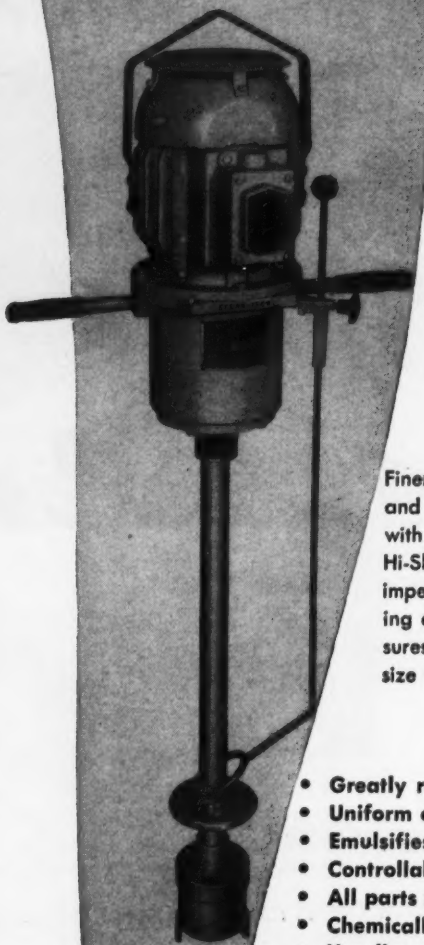
Check 4095 opposite last page.

SHEAR-FLOW



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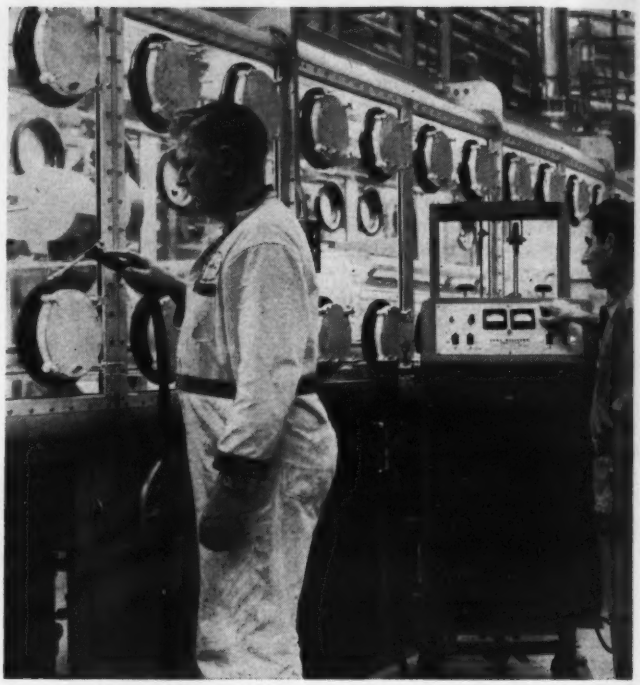

Leakage rate around gloves in hood-enclosure walls is checked with helium-sensitive mass-spectrometer leak detector

Fire, radiation threats are boxed-in

. . . by helium-ventilated hood-enclosure system in plutonium-fuel-fabrication facility at Argonne

In planning the plutonium-fuel-fabrication facility of Argonne National Laboratory (see last month's CHEMICAL PROCESSING, page 63), dulling the double-edged sword of fire and alpha radiation hazards was a major consideration.

In handling and fabricating plutonium, radiation danger is prime factor. While not hazardous to personnel as external radiation, alpha-particle emission has great potential danger because of possible inhalation, ingestion or introduction to cuts or skin lesions. Plutonium is not completely eliminated from body by natural processes and becomes fixed in tissues.

Second safety consideration in working with plutonium is that of potential fire hazard. A plutonium metal fire cannot be fought with water due to criticality problem. Also, water in contact with hot reactive metals releases large amounts of hydrogen which might result in secondary explosion.

To protect operating personnel against dangers of fire and radiation in the fuel-fabrication facility, an integrated

Dielectric sealing equipment is used for removal of items from hood line

system of hoods or glove boxes, incorporating helium ventilating atmosphere, was installed. Hoods branch out from each other in herring-bone pattern. They are gasketed together to prevent leakage.

Fuel-fabrication-facility building has 106 hoods. Volumes range from 18 to 800 cu ft. To permit safe handling of plutonium, arm-length neoprene gloves are sealed through walls of boxes. Also, operators wear thin surgical gloves to afford secondary protection.

Normal operating pressure of −0.6 to −0.8″, water-gage, referenced to room pressure, is maintained in glove boxes. Leakage rate of 0.02 cfh of gas per 100 cu ft of enclosed space, at negative pressure of 2″ water-gage, is maximum allowed. Leaks are hunted with helium-sensitive mass-spectrometer leak detectors.

Helium was chosen as ventilating atmosphere for glove-box-system because it has

Test Your Nuclear IQ

Here are eight questions to test your knowledge of things nuclear. Indicate if each statement is totally true or if it is false. Answers on page 186.

1) Uranium that is not enriched may be used as nuclear fuel.
2) Isotopes are radioactive forms of atoms.
3) Gaseous diffusion is one method for separating U-235 from U-238.
4) Nucleus of an atom contains protons, neutrons and electrons.
5) Nuclear reactors may be used for plutonium production.
6) Uranium ore is more abundant throughout the world than thorium ore.
7) Alpha particles ordinarily have greater penetrability than beta particles.
8) Present methods of nuclear power generation generally include direct conversion of nuclear energy to electrical energy.

(Reprinted from "Research For Industry," Stanford Research Institute, Menlo Park, Calif.)

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Adjustable
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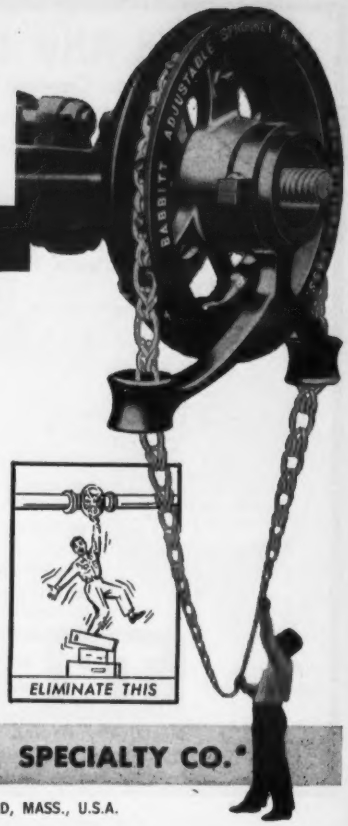

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Check 4097 opposite last page.

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Perfected work clothing with proved **less static than cotton**... and **remaining static-free for the life of the garment.**

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- Far safer; no flash burning of fabric.

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Ideal when lint-free conditions are essential. Savings are many times the original low cost of the garment. You get increased wear ... and you benefit from decreased product damage caused by dust, lint and dirt.

- Resists damage from acids and caustics up to 50 times longer than ordinary apparel.
- Exceptionally comfortable to wear throughout the year.
- More durable; shape-retaining; neater looking; easy to launder.

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Mail coupon for latest Worklon industrial apparel catalog plus supplement. No cost, no obligation, of course!

*—DuPont Dacron polyester fiber.

Worklon, Inc., Dept. CP99
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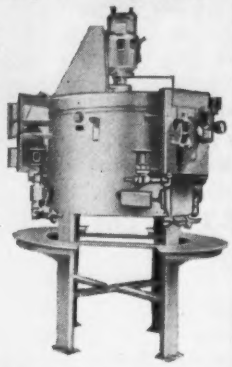
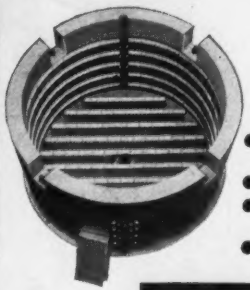
Check 4098 opposite last page.

KETTLES AND JACKETS

***Faster* Heating and Cooling . . . *Longer* Life**

- 5 Gallon to 325 Gallon Capacity Kettles for Waxes, Oils, Resins, Salts, Asphalts.
- TRENT "Folded-and-Formed" Heating Elements in Metal Inner Liner.
- Complete Temperature Control to Prevent Overheating, Scorching, Hot Spotting.
- Jackets for Retorts, Reactors and Autoclaves.





- High Temperature Uniformity to 2000°F.
- Compact, Space Saving Design.
- Low Thermal Inertia—High Dielectrical Strength (600V).
- Economical Installation and Maintenance.

WRITE FOR BULLETIN 72-TE

TRENT INC.

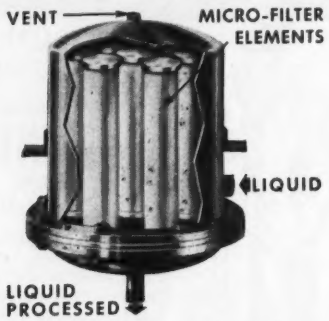
Electrically Heated Industrial Equipment

235 LEVERINGTON AVE., PHILADELPHIA 27, PA.

In Canada Supreme Power Supplies Limited, Toronto 14

Check 4099 opposite last page.

SELAS MICRO-FILTRATION



Selas Micro-Filter Multi-Element

Selas micro-porous porcelain filters are used for clarification, polishing, cold sterilization of pharmaceuticals, biologicals, fine chemicals and other continuous operations where physically pure liquids are required. Filters, in single and multi-element units, contain inert, micro-porous porcelain and are designed and built for aseptic or corrosive conditions.

Send for Bulletin 149

SELAS CORPORATION OF AMERICA DRESHER, PENNSYLVANIA — *Heat and Fluid Processing Engineers* — DEVELOPMENT · DESIGN · CONSTRUCTION

Check 4100 opposite last page.

high heat capacity and excellent heat-transfer characteristics. In addition, gas is amenable to purification by regenerative physical means.

Helium atmosphere system consists of two circuits—recirculating circuit, handling either 1000 or 2000 cfm of air, depending on how it is set up, and regenerative purifying circuit handling approximately 115 cfm of gas.

Recirculating blowers are seven-stage turbo-compressors which will handle approximately 1000 cfm at 3500 rpm at pressure head of about ½ psi. These units are used with aftercooler.

High-efficiency filters, measuring 12 x 12 x 6″, are provided at each hood line. Also, two 24 x 24 x 12″ high-efficiency filters are located in main-return line to refilter all gas in recirculating system prior to reaching turbo-compressors.

In repurifying circuit helium is passed through drying towers where almost all moisture is removed. After cooling to −40°F by freon-gas evaporation, it is passed through four activated carbon towers in series.

Regeneration of activated carbon towers is accomplished by valving main flow of helium to alternate set of carbon towers. Original towers are then evacuated, thereby clearing them of oxygen. Provision is made to pipe helium to towers from compressor when hot regeneration or defrosting is required.

Two completely separate stand-by air ventilation systems are incorporated. Each consists of pre-filter and final filter system. Also included is exhauster capable of handling approximately 3000 cfm of air.

(Further information concerning safety aspects of plutonium fuel fabrication may be obtained from Argonne National Laboratory, Box 299, Lemont, Ill.)

Check 4101 opposite last page.

(Process enclosures were fabricated by Nucledyne Company, Division of Cook Electric Company, 3412 River Rd., Franklin Park, Ill.)

Check 4102 opposite last page.

HERE'S THE MOST COMPLETE NOZZLE CATALOG EVER PUBLISHED

Whatever your nozzle problem, look first in this new catalog by Spraco. Here is complete information on a wide range of nozzle types and sizes as well as general spraying coverage data.

Send for your **FREE** *copy today . . .*

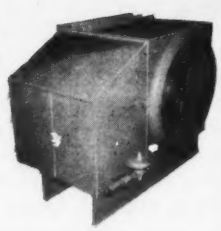
SPRAY *Engineering Company*

105 Cambridge Street, Burlington, Mass.

Check 4103 opposite last page.

Here's one way...

to insure adequate make-up air. But Hartzell intake units do the job more efficiently, and they provide precise temperature control, too. Send for Bulletin A-115.



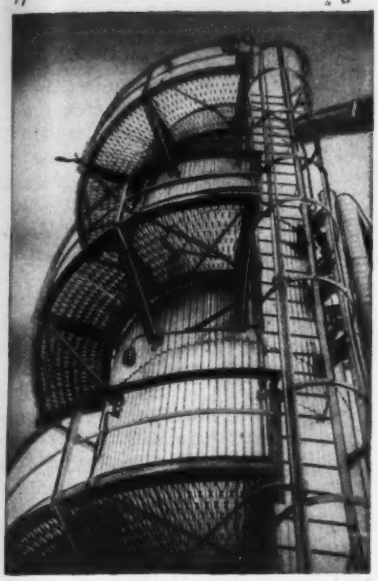
HARTZELL PROPELLER FAN CO.

Div. of Castle Hills Corp.

65 Thomas Blvd., Piqua, Ohio — A member of AMCA

Check 4104 opposite last page.

RAIN OR SNOW CAN MAKE CATWALKS DANGEROUS



Walkways, catwalks and treads made of solid wood, metal or other material can collect snow, rainfall, grease or oil and become dangerously slippery.

But these walking surfaces, made of an open mesh of metal bars on edge, cannot collect these substances, leaving the surface always *clean*, dry and tractional for safer access to high places.

As founders of the grating industry, the Irving Company can draw upon over half a century of experience to supply you with quality grating products for catwalks, treads and other practical and economical uses.

"A FITTING GRATING FOR EVERY PURPOSE"

Write for our General Grating Catalog.

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IRVING SUBWAY GRATING CO., Inc.
Originators of the Grating Industry

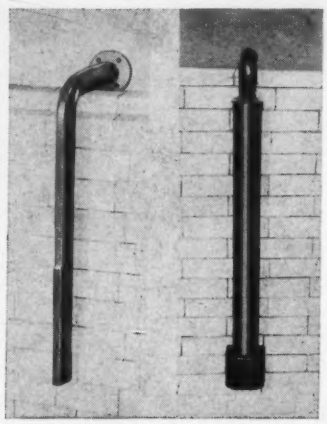
Offices and Plants at
5050 27th St., LONG ISLAND CITY 1, N. Y.
1850 10th St., OAKLAND 23, CALIFORNIA

Check 4105 opposite last page.

Sparging, leaching uses for steam-jet agitators

Steam-jet agitators are utilized to inject air into solutions to produce efficient agitation. Also, they are used to inject steam into solutions to obtain both efficient agitation and uniform heating.

When use of lead is permissible, lead-alloy-type agitators (fitted with carbon nozzles) are utilized. Impervious-graphite type are selected when chemicals in solution being sparged make use of lead inadvisable.



Lead-alloy-type steam-jet agitator is at left. Impervious style is shown at right

Leaching of rare metals is typical example of latter application. In first step, steam is introduced through agitators in water leach. Steam is also introduced through agitators in HCl-acid-leach second step, performed in same tank.

(Lead-alloy and Nocordal graphite jet agitators are products of Heil Process Equipment Corporation, 12901 Elmwood Ave., Cleveland 11, Ohio.)

Check 4106 opposite last page.

Torque-wrench slide rule permits calculation of actual torque at end of torque-wrench adapter, given length of assembly, lever length of torque wrench, and torque-wrench scale reading. Torque-wrench Slide Rule — P. A. Sturtevant Co., Addison, Ill.

Check 4107 opposite last page.

Guard your plant with

"SYN-FLEX"

U.S. PAT. NO. 2392967

Lightweight

NEOPRENE COVERED

FIRE HOSE

Check these advantages...

1—Basic lightweight "FIRE-FLEX" construction . . . 50' coil of 2" weighs only 35½ lbs., with diameter of only 22". Compare *that* with regular rubber-covered fire hose!

2—Black "Synplastic"® cover is highly resistant to abrasion and action of chemicals, oils, grease.

3—Does not require drying after use.

4—Extremely flexible . . . easy to handle.

5—ECONOMICAL because of its long service life.

300 LB. TEST

"SYNFLEX" is a modern fire hose especially designed for the Chemical, Petroleum and allied industries.

"If it's GOODALL, it MUST be Good!"

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Check 4108 opposite last page.

FOOTE BROS. DRIVES IN THE CEMENT INDUSTRY

LINE-O-POWER Reducer Driving Tunnel Belt feeding Final Conveyor Belt.

MAXI-POWER Reducer Driving Final Conveyor Belt, Universal Atlas Cement Plant, Buffington, Indiana

Lake carriers get a fast turn-around when they load clinker at United States Steel Corporation's Universal Atlas Cement Plant at Buffington, Indiana, because the clinker loading belts driven by Foote Bros. Reducers have a maximum capacity of more than 4 million pounds per hour!

The 48" wide, 2445 ft. long inclined Final Conveyor Belt, driven by a Foote Bros. MAXI-POWER Parallel Shaft Drive, which is fed by two 36" wide Tunnel Belts equipped with LINE-O-POWER Drives, moves the fused raw material from mountain-high stock piles into the holds of boats at the rate of 2000 tons per hour.

This is tough, demanding service. Drives are subjected to massive shock and maximum peak loads . . . yet the Foote Bros. Drives have never been shut down for emergency repair or maintenance!

Dependability like this is a standard by-product of Foote Bros. drive know-how. Why not take advantage of our more than a century of experience and specialization in building high quality transmission products?

There's a Foote Bros. Drive made to meet your power transmission requirement. Ask your nearby Foote Bros. Authorized Distributor for information or assistance concerning your power transmission problems. He's ready to help you.

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Check 4109 opposite last page.

Chemical Boobytraps

Unsuspected hazards awaiting the unwary

Acetone decomposes in an extremely vigorous manner. Vapors of acetone at 700°C yield ketene and methane.

Ketene is autoxidizable and forms unstable explosive peroxides with oxygen. Mixed sulfuric-nitric acids (such as used in nitrations) will decompose acetone with enough violence to break bottles and windows. This is particularly true if reaction is partially confined by dropping acetone into narrow-mouth bottle containing mixed acids.

Not widely appreciated is fact that water solutions of acetone are flammable over wide range. As little as 5% solution of acetone in water will flash at 140°F, if ignition source is present (as in Cleveland open-cup tester). The higher the acetone percentage in acetone-water mixture, the lower the flash point. Pure acetone has 0°F flash point.

(Information in this article is based on paper presented before National Safety Congress by Howard H. Fawcett, Safety Director, Research Laboratory, General Electric Company, Schenectady, N.Y.)

WANTED:

To Keep You Alive

Almost everyone knows of some tricky unexpected danger situation in his plant. CHEMICAL PROCESSING feels that the dissemination of such information to readers is important. Therefore a monthly series on Chemical Boobytraps is now appearing in this section. If you know of any such situation, please forward an account of it to:

Safety Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

THAT'S INTERESTING

Invisible inks 'light up'

Fluorescent inks which are invisible and transparent in ordinary light but which are intensely fluorescent under long-wave ultra-violet light have been developed by Ultra-Violet Products, Inc., San Gabriel, Calif. Used on non-porous surfaces, inks offer industry a good medium for invisible coding and marking of parts.

Cactus drugs

Bane to farmers and ranchers, the lowly cactus, yucca, and agave, native to Southwest U. S. and Mexico, may form keystone for a whole new industry. *Tomorrow Through Research* reports that these xerophytic plants contain beneficial drugs and may provide others not yet discovered.

For more information on product at right, specify 4110 see information request blank opposite last page.

For tested generator performance . . .

Come to Kemp

At Gulf Oil's Port Arthur, Texas refinery, purging inerts are supplied by Kemp Generator and Kemp Dryer working as a team. The units produce 30,000 SCFH for a bountiful and easily controlled supply at low cost.

Tested . . . and proved! Factory tested with rigid component checks, field tested by Kemp engineers at installation, and time tested by years of actual use. Proved that Kemp Inert Gas Generators are built to last, built to produce, built to be accurate.

At the heart of every Kemp Generator is the Kemp Industrial Carburetor, uncomplicated in concept, yet outstanding in performance. It provides sensitive and accurate control of inert analysis. A quick setting of the calibrated dial insures delivery of an unvarying mixture, regardless of line demands.

And Kemp design—rugged, simple, and sturdy—means that maintenance and attendance requirements are kept to a bare minimum. Kemp Inert Gas Generators stand up under the toughest conditions, yet produce with complete dependability.

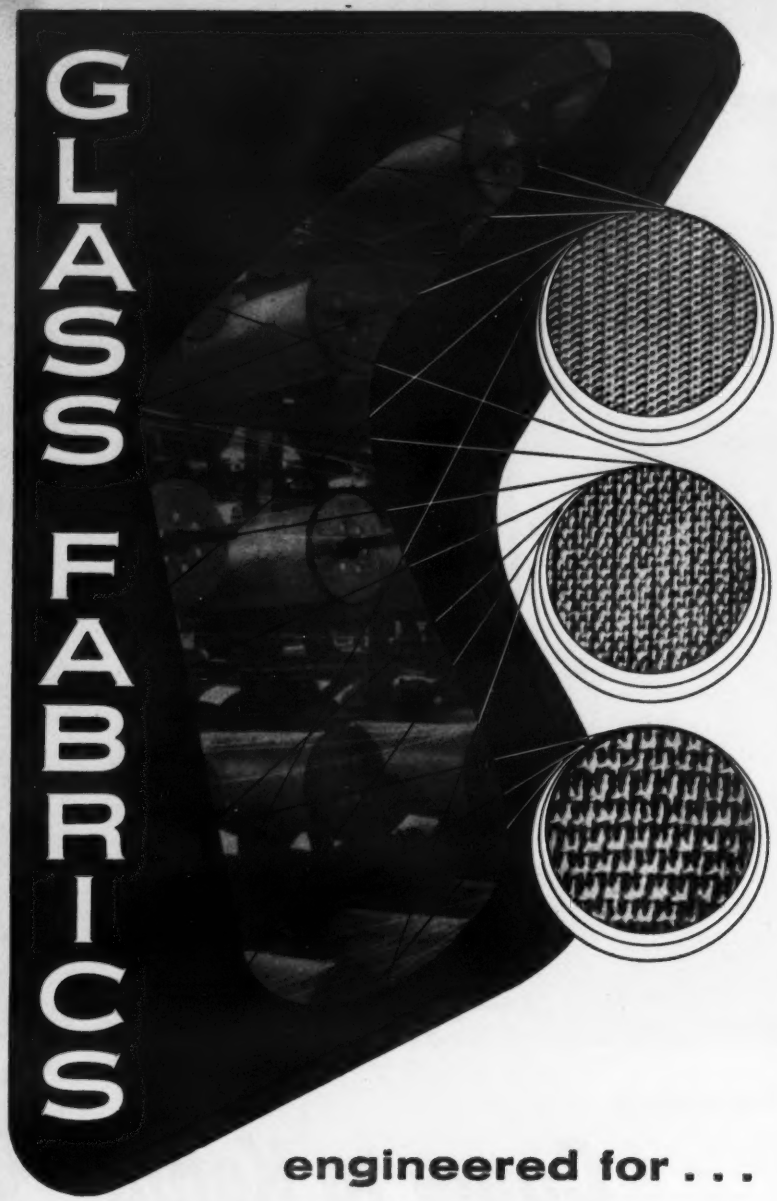
Your Kemp Representative is listed in *Chemical Engineering Catalog*. Give him a call for more information, or write direct for Bulletin I-10. THE C. M. KEMP MFG. CO., 405 East Oliver St., Baltimore 2, Md.

Convection Dryers

Atmos Generators

Nitrogen Generators

Oriad Dryers



engineered for . . .

•LIQUID FILTRATION •PLASTICS LAMINATION

•HIGH TEMPERATURE DUST COLLECTION •INSULATION

Tell us your application, we will send you samples

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Elizabethton, Tenn.: Paul Chapman Assoc., Box 787
Cincinnati, Ohio: Roselawn Center Bldg.
Houston, Texas: 1607 Jefferson Avenue
Pensacola, Fla.: Chem-Quip Co., 1102 Texar Drive

Check 4111 opposite last page.

Slurries of 60% solids are handled at 90 psi by controlled volume

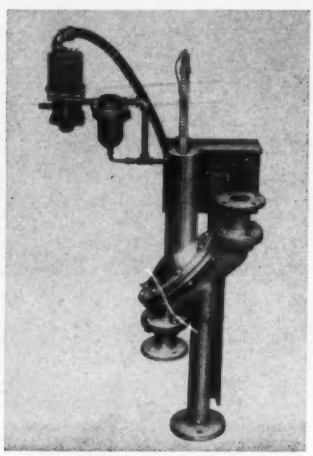
No stuffing box, packing, motor to cause leakage

Uses: Handling feeds to filters of all types.

Features: Pump can handle 60%-solids abrasive slurries at 90 psi. Elimination of motor, stuffing box, and packing precludes leakage.

Description: Controlled-volume-pump design is modification of that of transfer pump. Modifications include inclination of pump chamber, to eliminate entrained air from body automatically, and incorporation of engineered double-ball-check assemblies.

Pump consists of two hemispheres clamped together with slack diaphragm between. Lower hemisphere has inlet and outlet check valves. Upper half is connected to air supply by means of three-way solenoid valve. Timer electrically actuates valve, which alternately pressurizes and exhausts chamber.



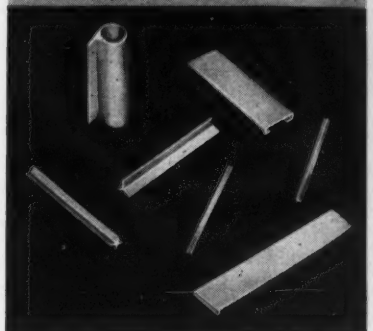
Controlled-volume-pump design is modification of that of transfer pump

Upon exhaustion of upper hemisphere, liquid is drawn by suction pressure into lower hemisphere through suction ball checks. This displaces diaphragm upward. After upper hemisphere fills, it is pressurized. Downward movement of diaphragm forces liquid from lower hemis-

NO MOLDS—NO WASTE—NO MACHINING

PF EXTRUDED TEFLON* SHAPES Reduce Cost of Components

for chemical applications



Some of the many shapes extruded by Pennsylvania Fluorocarbon for the chemical and mechanical industries include: fluid separators, feeding tubes for small parts, channels and seals.

These shapes offer:

- the widest service temperature range of any plastic (-450°F. to +500°F.)
- complete chemical inertness
- lowest coefficient of friction of any solid material
- very low permeability

Extreme Dimensional Accuracy Assured On Any Appropriate Design

PF extruded shapes made from Teflon allow design engineers to incorporate the chemical inertness and low coefficient of friction of Teflon into their products, economically. PF extrudes intricate Teflon shapes to extremely close tolerances, cuts them to lengths, post forms to requirements and performs any auxiliary machining steps. Molds are eliminated, there is no waste of Teflon and, frequently, no additional finishing operations are necessary. Result? Teflon components of extreme accuracy at lower cost.

Write, wire or call for a quotation on your particular Teflon component requirements, regardless of the intricacy of the shape. Shapes ranging from 2500 feet per pound to 6 feet per pound can be extruded.

PENNSYLVANIA FLUOROCARBON CO., INC.

1115 N. 38th Street, Phila. 4, Pa.
EVergreen 6-0603 TWX: PH 252

*DuPont registered trademark

Check 4112 opposite last page.

foreign or domestic

take your engineering PROBLEMS to

plant design
EXPANSION · MODERNIZATION

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PROCESS BUILDINGS · WAREHOUSES
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brochure on request

Check 4113 opposite last page.

***where there's a drying operation leading manufacturers* insist on* DUSTEX COLLECTORS**

DUSTEX miniature cyclone tubes, cast of white iron, provide an ultra-hard, cling-free, self-cleaning surface to assure maximum material recovery at a constant, high-speed rate.

DUSTEX patented design prevents condensation within the collector when inlet temperature is above the dew point. Handles temperatures up to 800°F. There are no filters to clog, no sludge to pump. It's virtually maintenance free!

LOW INSTALLATION COST and up to 99.8% efficiency make DUSTEX the perfect collector for spray dryer, rotary dryer or flash dryer processes.

**Name on request*

Write today for this free bulletin on the new D-584 DUST COLLECTOR.

P.O. BOX 2520, BUFFALO 25, N.Y.

DUSTEX CORP.

Check 4114 opposite last page.

phere through discharge ball checks. Flow-volume-variation range is 0 to 180 gal/hr.

(O.D.S. controlled-volume pump is product of Milton Roy Company, Stamford, Connecticut.)

Check 4115 opposite last page.

(O.D.S. controlled-volume pump utilizes slurry-pump-design principle of Dorr-Oliver, Inc., 1300 E. Mermaid Lane, Philadelphia 18, Pa.)

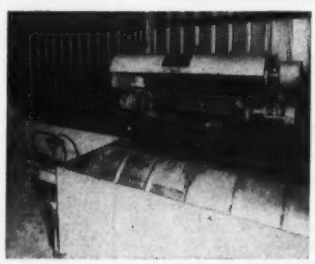
Check 4116 opposite last page.

Drum-cleaning rate— 1500 55-gal drums in eight hours

Uses: Cleaning 55-gallon drums.

Features: Time studies based on normal operations indicate unit can clean 125 drums/hr or 1000 per eight-hour shift. Under ideal conditions, this rate reportedly can be increased 50% or more.

Description: Automatic drum cleaner consists of long bath tank containing caustic solution. Solution loosens outside coatings and inside residues of drum. Drums revolve



In automatic cleaner drums are cleaned initially in caustic-bath tanks and then moved into battery of brushes which finish job

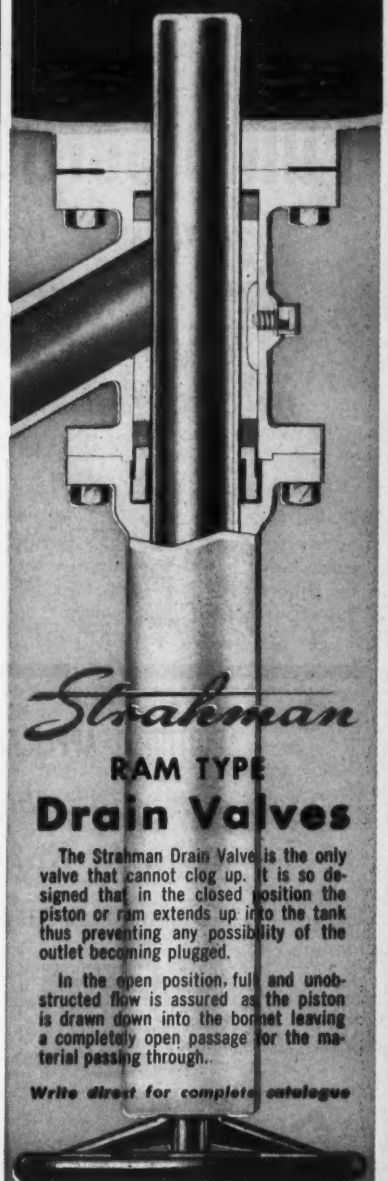
in solution while moving forward to battery of brushes which clean both ends and sides. Built-in lift fork then deposits drums, cleaned to bare metal, on rinse rack. One man can operate unit.

(Automatic drum cleaner is product of Drumatic Corp., Box 3356, Rincon Annex, San Francisco, Calif.)

Check 4117 opposite last page.

a FLUSH BOTTOM VALVE *that* WILL NOT CLOG UP!

Designed for Chemical and Pharmaceutical Industries



Strahman

RAM TYPE Drain Valves

The Strahman Drain Valve is the only valve that cannot clog up. It is so designed that in the closed position the piston or ram extends up into the tank thus preventing any possibility of the outlet becoming plugged.

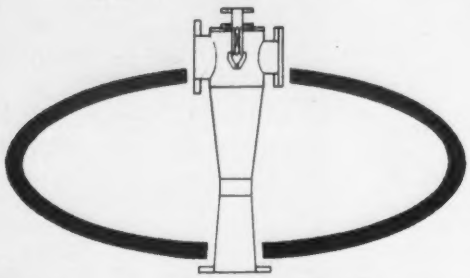
In the open position, full and unobstructed flow is assured as the piston is drawn down into the bonnet leaving a completely open passage for the material passing through.

Write direct for complete catalogue

STRAHMAN VALVES, INC.
NICOLET AVE., FLORHAM PARK, N. J.

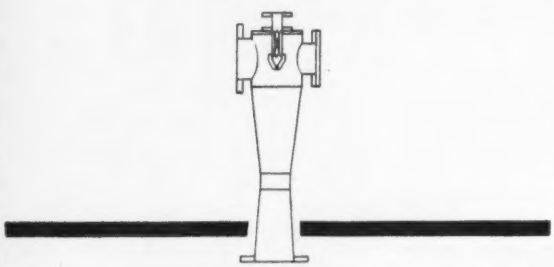
Check 4118 opposite last page.

CROLL-REYNOLDS
Jet-Venturi



Fume Scrubbers

minimize odors
clean and purify air
and other gases
without fan or blower



ADDITIONAL APPLICATIONS

to recover valuable solids
use as Jet Reactors

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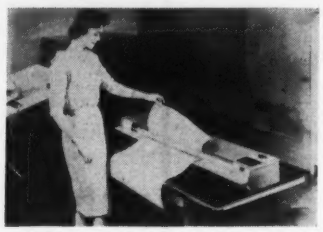
Check 4119 opposite last page.

Tracings up to 42" wide copied at 36"/min rate

Diazotype reproduction machine copies 42"-wide tracings in any length. With machine turned on and speed dial set, insertion of tracing is all that



With machine turned on and speed dial set, insertion of tracing is all that is necessary to initiate copying action

is necessary to initiate copying action. Unit incorporates fluorescent light. Mechanical-speed range is 3 to 36 in/min. Copying unit is 6½" high x 12" deep x 56" long.

(Copyflex model 42 is product of Charles Bruning Company, Inc., Mt. Prospect, Ill.)

Check 4120 opposite last page.

NUCLEAR QUIZ ANSWERS

Answers to "Test Your Nuclear IQ," appearing on page 179, are as follows:

1) True—Unenriched uranium is principal fuel for British reactors.

2) False—Some isotopes are radioactive. Others are not.

3) True—This is chief method used in United States.

4) False—No electrons are in nucleus.

5) True—This is the major function of Hanford Installation.

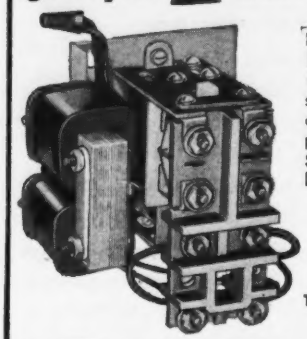
6) False—Abundance of thorium ore exists, though it is difficult to recover.

7) False—Alpha particles can be stopped by sheet of paper.

8) False—In presently existing nuclear power plants, some form of intervening steam engine is necessary. However recent research findings have indicated that direct conversion may become feasible in future.

WARRICK Floatless Electrode Type
LIQUID LEVEL CONTROLS . . .

give you all these advantages!



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Write for 32-page Catalog which gives complete specifications

Two pole control shown at left

YOU CAN USE OUR CONTROLS FOR:

- Single & multiple pumps
- Motor & solenoid valves
- High & low cutoffs & alarms
- Condensate contamination
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- Waste sumps

Special controls to custom requirements

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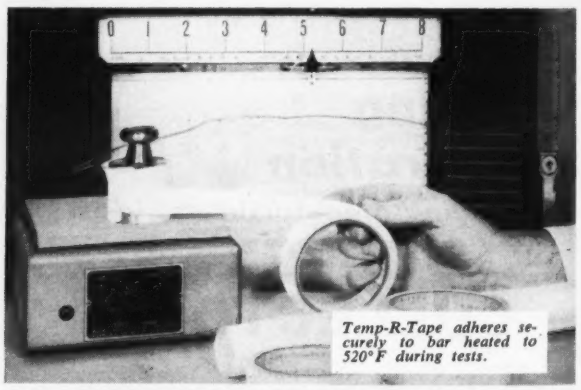
Dep't 9 Telephone JOrdan 4-6667

Check 4121 opposite last page.



Temp-R-Tape adheres securely to bar heated to 520°F during tests.

CHR PRESSURE-SENSITIVE TEFLON® TAPES

- *−100°F to 500°F applications*
- *Class H and Class C insulation*
- *Non-stick and low friction facing*
- *Chemical resistant facing*
- *Easy to apply*

Temp-R-Tape is available from stock in rolls and sheets. All four types — Temp-R-Tape T; TH; C and TGV — combine some form of Teflon backing with silicone polymer adhesive to provide easy-to-apply pressure-sensitive and thermal curing pressure-sensitive tapes for electrical and mechanical applications. Designed for extreme temperatures, Temp-R-Tapes possess high dielectric strength, low power factor, high elongation, negligible moisture absorption, are non-corrosive and non-contaminating.

FREE SAMPLES and folder — write, phone or use inquiry service.

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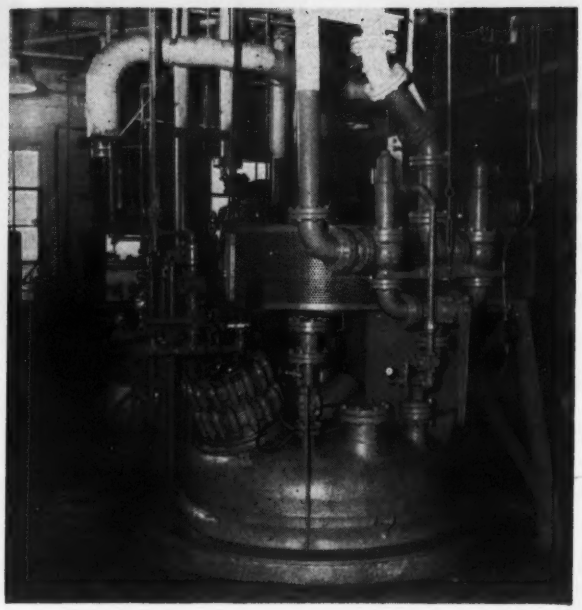
CHR **CONNECTICUT HARD RUBBER**

*duPont TM

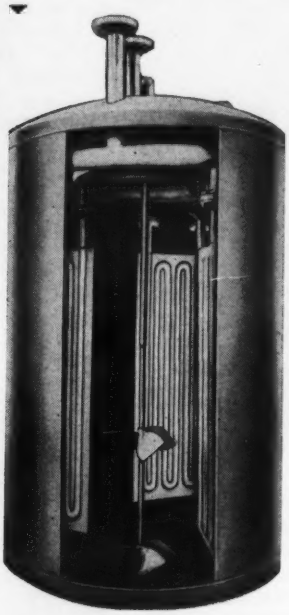
Main Office: New Haven 9, Connecticut

Check 4122 opposite last page.



Reactor area of Goodyear Tire & Rubber Company's synthetic-rubber pilot plant. Coil panels installed in jacketed glass-lined 1200-gal polymerization reactor provide maximum cooling capacity in minimum space

Simplified cutaway view of a reactor installation of cooling panels. Slip-on type flanges, connecting coil units to coolant pipes, permit positioning of panels to provide desired baffling arrangement



Cleaning problems sidestepped by panel-coil cooling

. . . which provides needed additional cooling capacity for jacketed polymerization reactor

Problem: Conventional pipe-coil cooling would have been inadequate means of providing additional cooling capacity required for a jacketed glass-lined pilot-plant polymerization reactor at Goodyear Tire & Rubber Company, Akron, Ohio. Space limitations within 1200-gal tank, coupled with necessity for careful cleaning following each run, precluded use of such equipment.

Variety of materials handled in reactor necessitate thorough cleaning following each test run. Installation of conventional cooling units would not have left enough room inside vessel to permit entrance of cleaning personnel. Also, pipe-coil equipment would have been prone to excessive clogging with rubber, thus compounding cleaning problems.

Solution: Six rectangular coil panels were installed in polymerization reactor to provide additional cooling capacity. Units are fabricated from two sheets of metal, embossed and welded together so as to form passages for refrigerating liquid. They are glass-coated. Flanges connecting panels to coolant pipes are of slip-on type. This permits positioning as may be desired for baffling.

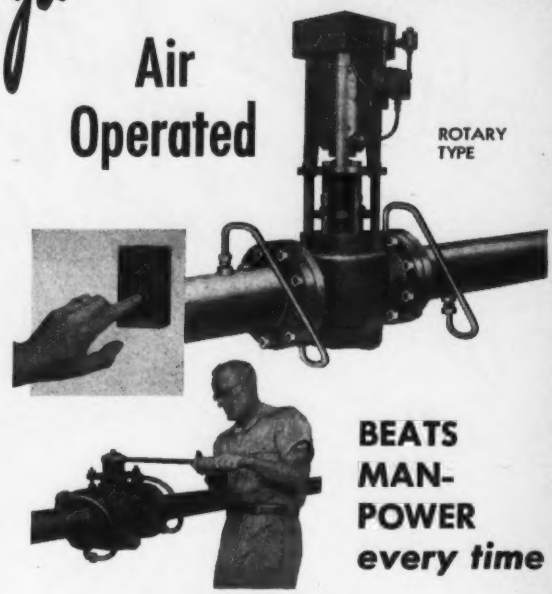
Results: Although installation of panels increased total cooling-surface area by ony 85%, total heat-transfer capacity of reactor has been improved by factor of three.

Panels have required even less cleaning than anticipated. This can be attributed to fluid turbulence over the surface and absence of gaps that could become clogged with coagulum. Glass-coated surfaces of panels are easily cleaned. *To next page*

Jacketed PLUG VALVES

Air Operated

ROTARY TYPE



BEATS MAN-POWER *every time*

for SPEED, SAFETY, CONVENIENCE

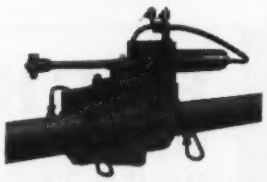
Parks-Cramer jacketed plug valves can now be supplied for air or hydraulic operation. Actuators are either cylinder or rotary type depending on degree of rotation, torque and indexing sequence required.

Multiport valves can be arranged to stop at any predetermined position, and to proceed from one position to another in any sequence manually or automatically.

Remote control stations with port position indicating lights can be supplied as required.

For hazardous locations, explosion-proof accessories can be furnished.

Actuators are mounted directly on the valve—brackets or bracing from adjoining pipe or building is not required. Linkage to valve stem is direct through couplings or levers—clumsy rack and pinion gearing not needed.



CYLINDER TYPE

For complete description, details and dimensions, send for our new catalog supplement 356-S.

Parks-Cramer Company
FITCHBURG 12, MASSACHUSETTS

Check 4123 opposite last page.

From preceding page

Utilization of heat-exchange panels has permitted installation of maximum cooling capacity while still permitting sufficient space for a man to enter vessel for thorough cleaning.

(Thermo-Panel heat exchanger is product of Dean Thermo-Panel Coil Division, Dean Products Inc., 616 Franklin Ave., Brooklyn 38, N.Y.)

Check 4125 opposite last page.

(For more information on glass coating, contact Glascote Products, Inc., Division of A. O. Smith Corporation, 20919 St. Clair Ave., Cleveland 17, Ohio.)

Check 4126 opposite last page.

Concrete patch is depicted in Instant-Use Brochure — Flexrock Company, 3611 Filbert St., Philadelphia 1, Pa.

Check 4127 opposite last page.

Molten sulfur stored in insulated tanks for easy handling

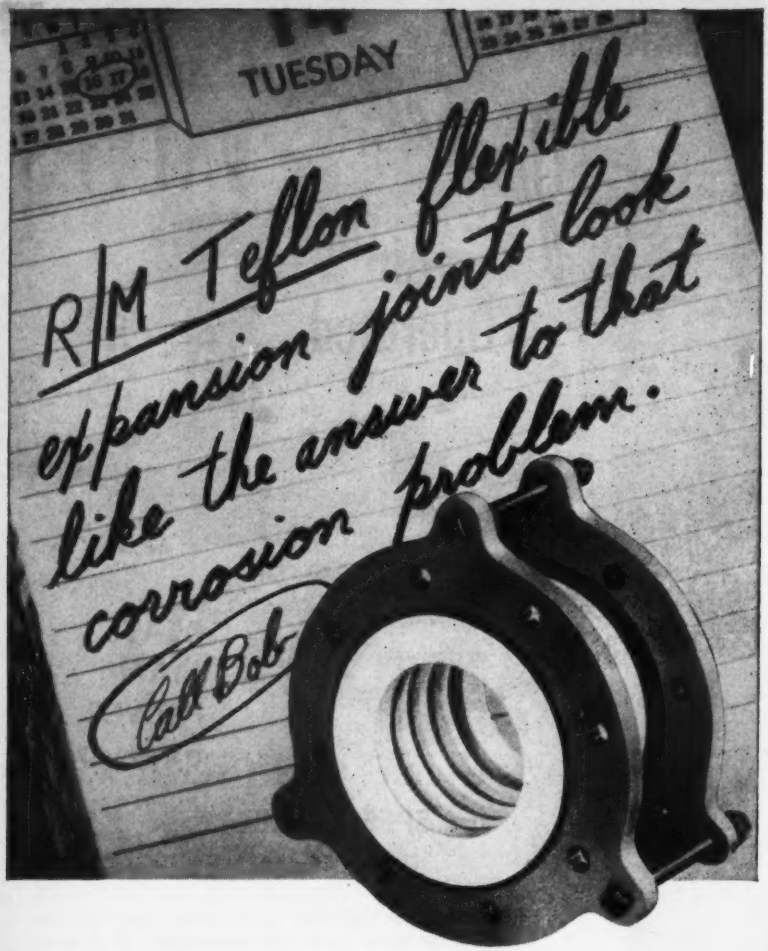
Spun-mineral-wool felt used to reduce heat loss

Two heated tanks are being used to store 4500 long tons, each, of liquid sulfur at approximately 265°F. Tanks are insulated with spun-mineral-wool felt.

They were constructed at River Transportation Company of Cincinnati, Ohio. Bright sulfur is stored in one tank, while other contains dark variety.

Each tank is 27′ tall and has 65′ diam. Heat is from 40-psi steam passing through 3200 lineal feet of 1½″ pipe, running inside tank walls, floor and roof.

Fibrous felt insulation has max general-service temperature limit of 450°F. Thermal conductivity in this applica-



Chemical-handling accessories, made of "Teflon"* by Raybestos-Manhattan, are the answer to many of your more difficult problems.

"Teflon" shows no reaction to chemicals—except for fluorine gas and chlorine trifluoride, both at high temperatures, and molten alkali metals. Impervious to all known industrial acids and caustics. Can be kept in continuous service in a wide temperature range.

Another valuable plus for you: R/M's strict quality control and precision workmanship. You can depend on R/M "Teflon" products: solid and envelope gaskets, sheets, rods, tube, tape, expansion joints, flexible couplings, stuffing box and valve stem packings, Vee-Flex packings, solid and braided packings.

R/M's engineers have amassed a wealth of experience in manufacturing packings and gasket materials to meet the most exacting requirements of the chemical industry. This experience is at your disposal any time—write R/M Packing Division.

R/M MAKES A COMPLETE LINE OF MECHANICAL PACKINGS—including Vee-Flex,* Vee-Square,* Universal Plastic and "versi-pak"*; GASKET MATERIALS; "TEFLON" PRODUCTS. SEE YOUR R/M DISTRIBUTOR.
*A Du Pont trademark

R/M PACKINGS
RAYBESTOS-MANHATTAN, INC.
PACKING DIVISION, PASSAIC, N.J.
MECHANICAL PACKINGS AND GASKET MATERIALS

RAYBESTOS-MANHATTAN, INC., Mechanical Packings • Asbestos Textiles • Industrial Rubber • Engineered Plastics Sintered Metal Products • Abrasive and Diamond Wheels • Rubber Covered Equipment • Brake Linings Brake Blocks • Clutch Facings • Industrial Adhesives • Bowling Balls • Laundry Pads and Covers

Check 4124 opposite last page.

Binks spray nozzles
for washing, cooling, processing, humidifying, dehydrating, and hundreds of other applications.
You'll get the right nozzles quicker by calling Binks...manufacturers of one of the most complete selections ever produced.
There is a size and spray pattern for every purpose...with nozzles cast or machined from standard or special corrosion-resistant metals and materials.
MAIL COUPON NOW!
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Binks
A COMPLETE LINE OF INDUSTRIAL SPRAY NOZZLES AND COOLING TOWERS
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120-32 Carroll Ave., Chicago 12, Ill.
O. K. Binks, send me your comprehensive Spray Nozzle Catalog without obligation.
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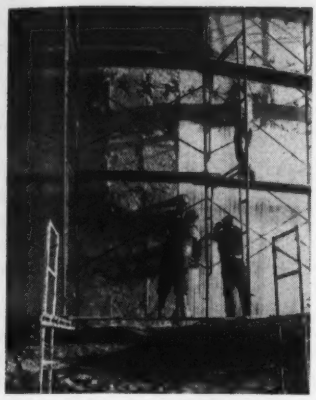
Check 4128 opposite last page.



Spun felts were quickly covered with corrugated-aluminum rain jacket to protect from moisture which would impair insulating efficiency

tion is less than 0.30 Btu/sq ft/hr/°F/in.

In application of insulation, stainless steel is first welded to exterior of tank walls. Then sheets of resilient insulating material were impaled over studs and held in place by annealed-iron tie wires, laced from stud to stud in diamond pattern. Sheet metal protective shield of corrugated-aluminum was finally applied to protect insulation from weather.

(Spun-mineral-wool-felt insulation is product of Baldwin Hill Company, Trenton, N.J.)

Check 4129 opposite last page.

Humidity control, by means of steam, gas, or electric reactivation, is detailed in "DRYing Facts" — Lectrodryer Division, McGraw-Edison Company, 352 32nd St., Pittsburgh 30, Pa.

Check 4130 opposite last page.

Gas generators of various types are cataloged in Bul I-10 — The C. M. Kemp Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.

Check 4131 opposite last page.

Do you want to make a new product without any capital investment?

Do you have a plant producing at capacity and need more product?

Then write for this booklet. We have biochemical and chemical facilities now available for custom production. With forty years experience in biochemistry and as one of the first companies to produce chemicals by synthetic processes, we have the production "know-how," technical assistance and the equipment now available to make your products. Return coupon and get the facts on how we may be of service to you. No obligation.

Mr. J. F. Dudley, Vice-President • Production and Engineering
Commercial Solvents Corporation
260 Madison Avenue, New York 16, N.Y.

Please send me your booklet on "Biochemical and Chemical Facilities Now Available for Custom Production."

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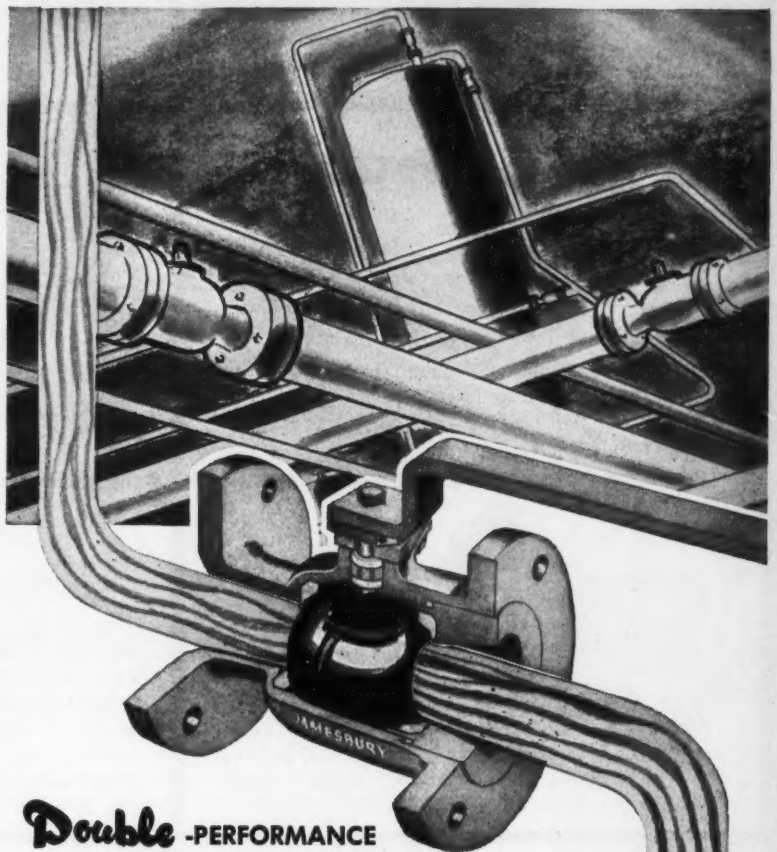
CP

Check 4132 opposite last page.

Jamesbury "Double-Seal" Ball Valves Give Double-Value



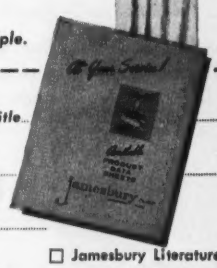
Double-PERFORMANCE

Wherever the Jamesbury "Double-Seal" principle is employed in its multiple industrial applications, "Superior performance" is the phrase heard everywhere.

PERFORMANCE — the direct result of the high-efficiency and the long, maintenance free life of the Jamesbury product: "Double-Seal" Ball Valves.

Ball Valves in pipe sizes ¼" to 8" in Bronze, Aluminum, Stainless Steel, Carbon Steel. PVC ½" to 4". Quarter-turn.

Distributors In Principal Cities.
Get The Complete Facts On The Jamesbury "Ball Valve" Principle.



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☐ Jamesbury Literature
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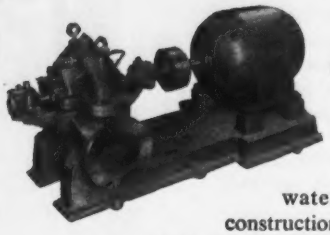
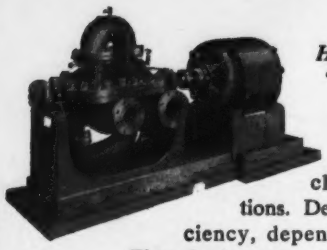
JAMESBURY CORP., 65 NEW STREET, WORCESTER, MASS.

Check 4133 opposite last page.

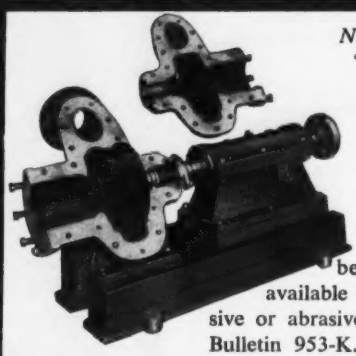
HOW MUCH WILL IT COST YOU



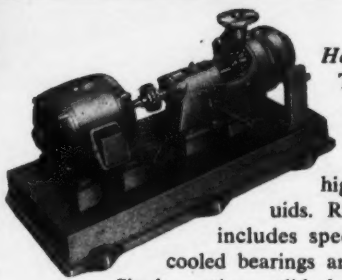
Clear Water Pumps: "Buffalo" Double Suction Pumps assure maximum efficiency in clear water service. Rugged construction provides long life with minimum maintenance. 10 to 14,000 gpm capacities. Write for Bulletin 955-R.



High Pressure Pumps: "Buffalo" Multi-Stage Pumps are ideal for boiler feed and other clear water applications. Designed for top efficiency, dependability, long life. These husky pumps operate against heads as high as 1500 ft., in capacities to 900 gpm. Write today for Bulletin 980-D.



Non-Clogging Pumps: "Buffalo" Diagonally Split-Shell Pumps are specially designed for moving high consistency liquids. Down-time, wear and wedging are reduced. Rubber-lined models are available for pumping corrosive or abrasive liquids. Write for Bulletin 953-K.



Heat Transfer Pumps: These special "Buffalo" pumps are engineered for handling high-temperature liquids. Rugged construction includes special alloys, water-cooled bearings and special packing. Single suction, solid shell design is highly efficient. Write for full details.

Chemical Liquid Pumps: These special "Buffalo" Pumps are engineered for severe service in handling most corrosive, abrasive or high consistency liquids. Ten special types are available in a variety of trim. Write for Bulletin 982-A.

NOT TO INSTALL "BUFFALO" PUMPS?

How "Buffalo" Pumps Can Save You Money Right Away: "Buffalo" offers a broad line of pumps. This means you can usually choose the right pump to fill almost every liquid-moving need. With "Buffalo" Pumps you pay only for the type, size and capacity required — no more. This often means substantially lower initial cost.

How "Buffalo" Pumps Can Save You Money Over the Years: "Buffalo" Pumps are engineered for peak hydraulic efficiency. This gives you consistently lower pumping costs. "Buffalo" Pumps are ruggedly built throughout. Extra heavy-duty components reduce maintenance costs over a longer productive life span. "Buffalo" Pumps are designed for quick, easy access to inner parts. Thus routine maintenance costs are lower. "Buffalo" Pumps feature parts interchangeability. This means further savings in reduced parts inventories.

Your nearby "Buffalo" Engineering Representative will be glad to help you choose the pumps that will most economically fill your needs. Phone him today, or write us direct.

"Buffalo" PUMPS

BUFFALO PUMPS
Division of Buffalo Forge Co.
524 Broadway Buffalo, N. Y.

Canada Pumps, Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

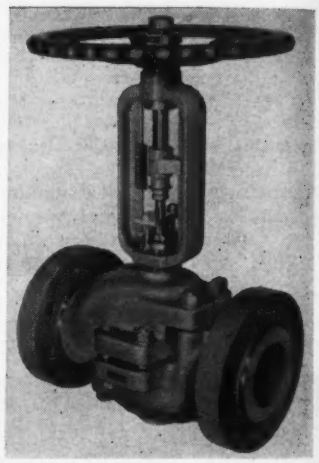
Check 4134 opposite last page.

Single-seat-valve body has 600-lb rating for walls

Uses: Manual on-off throttling control of fluids.

Features: Single-seated-valve body incorporates walls cast to 600-lb-ASA rating. Split body permits quick disassembly for inspection and maintenance.

Description: Hand-wheel operated control valves have integral bonnet design with bolted-type packing box.



Control of valves is accomplished through vernier position indicator, long stroke and oversized hand wheel

Standard packing is Teflon-asbestos. Allpax is utilized for temperatures over 450°F.

Control is accomplished through vernier position indicator, long stroke and oversized hand wheel. Valves have fully guided throttle plug and lift-out seat-ring design. Design also includes non-rotating stem and separable or integral flanges.

(Series LM manual-control valves are product of Conoflow Corporation, 2100 Arch St., Philadelphia 3, Pa.)

Check 4135 opposite last page.

Piston packings of all-Nylon composition, available in various sizes, types, and textures, are outlined in Bul 5503 — Darling Valve & Manufacturing Co., Williamsport 4, Pennsylvania.

Check 4136 opposite last page.

THAT'S INTERESTING

Burglary risk cut

A new knock-out punch for burglars has been prepared by the Teletronic Security Systems, Inc. It's a 24-hour silent burglar alarm system which links subscribers directly to local police stations. Lawmen not only can hear burglars at work, but can turn on lights while burglary is in progress.

Champagne gibberellins

Better champagne through gibberellins may result from using these growth-producing chemicals in New York State vineyards. Tests conducted at Taylor Wine Company show grapes of the Delaware variety treated with gibberellins produced 13% more fruit by weight per shoot.

For more information on product at right, specify 4137 see information request blank opposite last page.

Service for PETRO-CHEMICALS from... ALLIS-CHALMERS

A local call
brings service to any branch plant

Your branch plants — no matter where they are located — are only a phone call away from Allis-Chalmers service.

To provide this guarantee of prompt service on mechanical and electrical equipment, A-C offers its petro-chemical customers a whole mapful of personnel and facilities. They include:

- **9 Regional Offices** — to serve as coordination centers from coast to coast.
- **79 Local Offices** — covering every industrial area in the country.
- **Field and Erection Personnel** — located strategically for 'round-the-clock' duty.
- **Certified Service Shops** — a vast network to provide minutes-away service.
- **Warehouse Stocks** — there's no waiting anywhere for replacement parts and components.

Matching this service is a tremendous scope of industry-designed equipment from one source. Ask your A-C representative about the last word in product designs, all proven by research and application, all built for outstanding quality control. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Products for Petro-Chemicals: Electrical Generation, Distribution and Utilization Equipment; Pumps, Motors and Control; *Texrope* Drive Equipment; Processing Machinery (mills, kilns, screens, etc.); Water Conditioning Systems, plus Materials Handling Equipment.

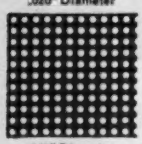
Texrope is an Allis-Chalmers trademark.

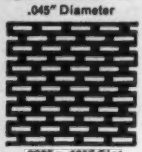
A-C ALLIS CHALMERS

The *Right* PATTERN
The *Right* OPEN AREA
The *Right* MATERIAL
FOR EVERY SCREENING REQUIREMENT

H&K PERFORATED SCREENS

.020" Diameter


.045" Diameter

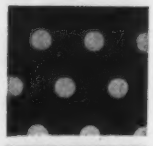

.028" x .125" Slot

For grading, sieving, dewatering, filtering, straining—when you want a screen "just right" for the job—you can depend on H & K.

H & K screens are made to your order, with holes accurate and uniform in size, shape and spacing. Burr-free holes are slightly larger at bottom—reduce blinding, save on down time. Margins and unperforated areas are furnished as specified.

Screens are made in practically any material desired... including plastic. H & K specializes in perforating stainless steel, monel and other corrosion-resistant alloys. Let us work with you on your screening requirements.

Just a few of the many H&K patterns are illustrated


Tapered Round Holes in Steel

No. 3 Diagonal Slot

FIND NEAREST H&K AGENT in the 'Yellow Pages'
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Write for H&K General Catalog

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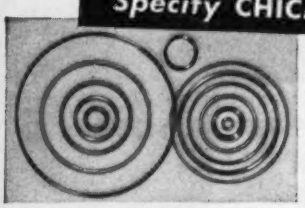
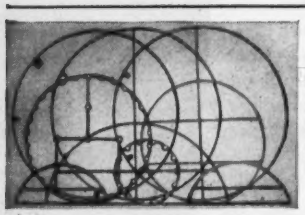
Check 4138 opposite last page.

For Dependable GASKETS

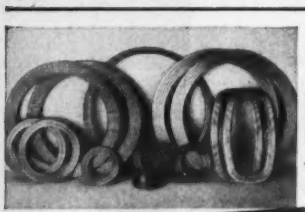
Specify CHICAGO-WILCOX



RING GASKETS
For ring-type flanged joints in high pressure lines. Made of soft iron, standard steel alloys or any non-ferrous metal to any desired cross section. Ask for Bulletin 563.



HEAT EXCHANGER GASKETS
Made in any size or shape needed in double-jacket type. Also cut from solid metal or sheet packing. Ask for Bulletin 564.



CORRUGATED METAL GASKETS
Plain or jacketed type. Made of ingot iron, aluminum, stainless steel, copper, brass, nickel and monel in all sizes and shapes. Ask for Bulletin 565.

CHICAGO-WILCOX MFG. CO.

Prompt Deliveries
7717 So. Avalon Avenue
Chicago 19, Illinois

Check 4139 opposite last page.

ENGINEERING & SAFETY

Inertly sealed pipe joints also lubricated

Uses: Sealing and permanent lubrication of pipe joint.

Features: Chemically inert tape can withstand processing temperatures from liquid-oxygen range through that of super-heated steam. It is not affected by oil traces or other lubricants in steam line.

Description: PFE fluorocarbon resin tape conforms to all types of pipe treads and fittings. Tape is non-adhesive, but sufficiently coated to stick to almost any glossy surface. It is available in double and single 36-yard rolls in ¼ to 8" widths.

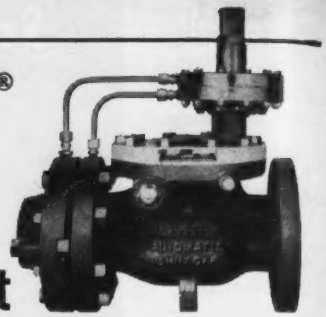
(Scotch-pipe sealant tape 547 is product of Minnesota Mining and Manufacturing Co., 900 Bush Ave., St. Paul 6, Minnesota.)

Check 4140 opposite last page.

Chemically inert tape can withstand processing temperatures from liquid-oxygen range to that of superheated steam

"The boys said you wanted to see me about a 'no-accident' award!"

SENTRY® VALVES



stop or start full round flow in split second

Latch-type valve closes instantly!
Piston-type valve opens instantly!

Sentry Valves are used on liquid and gas lines . . . protect property, materials and processing. Sizes 1½" to 8".

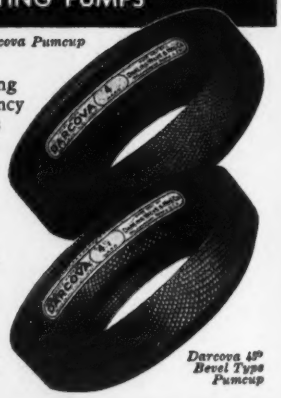
Have details on quick, positive action of this remarkable Coppus line at your fingertips. WRITE to COPPUS ENGINEERING CORPORATION, 389 Park Avenue, Worcester 2, Mass.

ANOTHER COPPUS "BLUE RIBBON" PRODUCT

Check 4141 opposite last page.

DARCOVA PUMCUPS
now available with
100% NYLON COMPOSITION
for HYDRAULIC CONTROLS, AIR CYLINDERS, RECIPROCATING PUMPS

Darcova Pumcup


Darcova 45° Bevel Type Pumcup

DARCOVA PUMCUPS—long noted for unequalled efficiency and life in all kinds of cylinders—are now greatly exceeding their own performance records! The new 100% Nylon Composition, available *only* in Darcova Pumcups, does it!

Nylon Pumcups are made in sizes, types and textures exactly right for your particular equipment—ready *now* to give you unprecedented piston packing performance!

Write for helpful data Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA TRADE MARK PUMCUPS

Check 4142 opposite last page.

THAT'S INTERESTING

Medicine tops in science

The public is more interested in medicine than in any other science, says a University of Michigan social scientist. Second is the contribution research has made to human living and welfare. Science's part in the military ranks in third place.

Unbelievable!

Could you live on an income of less than $1000? *Agricultural Research* notes that about 1.1 million *real* farm families, comprising over 4 million people—a fourth of U.S. farm population—have incomes under $1000.

Bigger market for adhesives

Recent survey by Chemical Marketing & Research Company indicates market for synthetic adhesives will increase about 15% this year over 1958.

For more information on product at right, specify 4143 see information request blank opposite last page.

SCOPE of PUMP DEVELOPMENT from... **ALLIS-CHALMERS**

Cross-section of one stage showing arrangement of bowl, wearing ring, impeller, shaft and bearings.

New vertical turbine pump -- the prime pump that needs no priming

Now Allis-Chalmers brings its 85 years of pump experience to the short-coupled vertical turbine-type field. This addition not only rounds out industry's most complete single source for pump installations, it offers many advantages wherever liquids are to be pumped. Standard sizes for heads up to 400 ft or more, and capacities ranging from 20 to 8000 gpm.

Pressures can be increased by simply adding a stage to the existing pump without increasing space requirements. Equipment and installation costs are low. Motor and discharge nozzle are supported by a single, small foundation. There's no need for suction pipe, interlock controls or priming equipment. Allis-Chalmers hollow-shaft motors remove the danger of open couplings.

Many advantages — Self-priming • eliminate suction piping costs • save space, motor support and discharge nozzle are integral • low first cost • increase pressure easily • operate quietly • low maintenance with one stuffing box • no motor flooding.

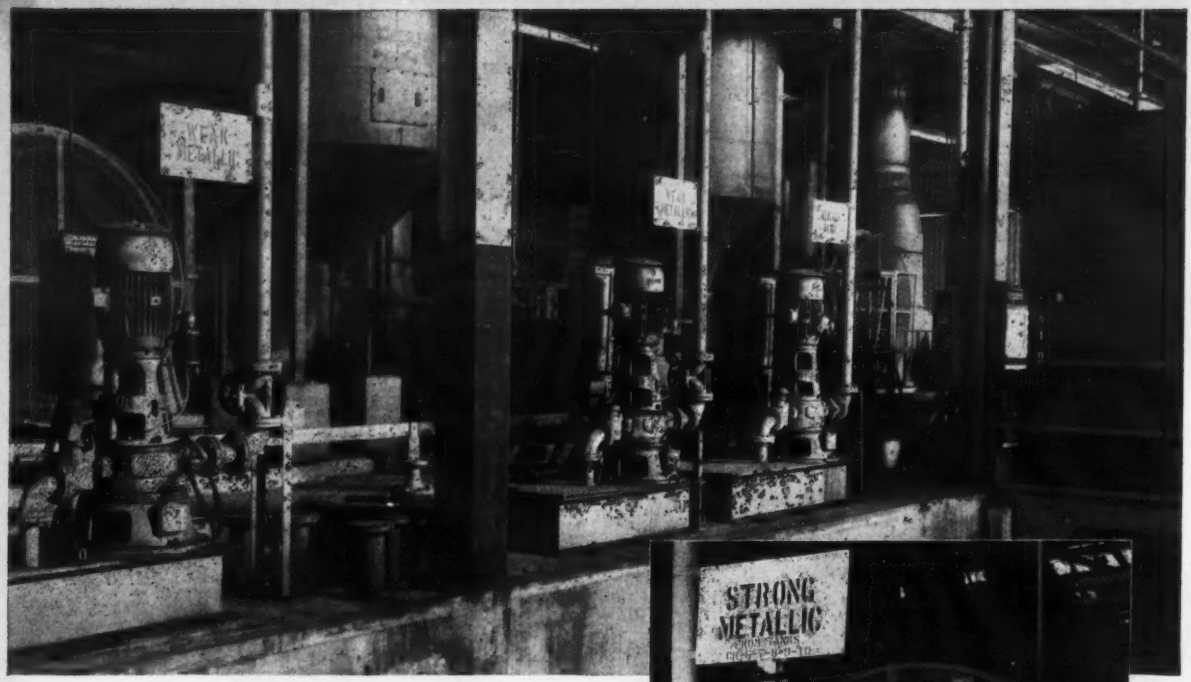
Many applications — Water systems, irrigation, condenser systems, bilge and sump service, dry docks, fire equipment, filter washing, recirculation, transfer or process pumping, cooling condensers and diesel engine jackets, air conditioning, caisson and mine dewatering, general-purpose pumping.

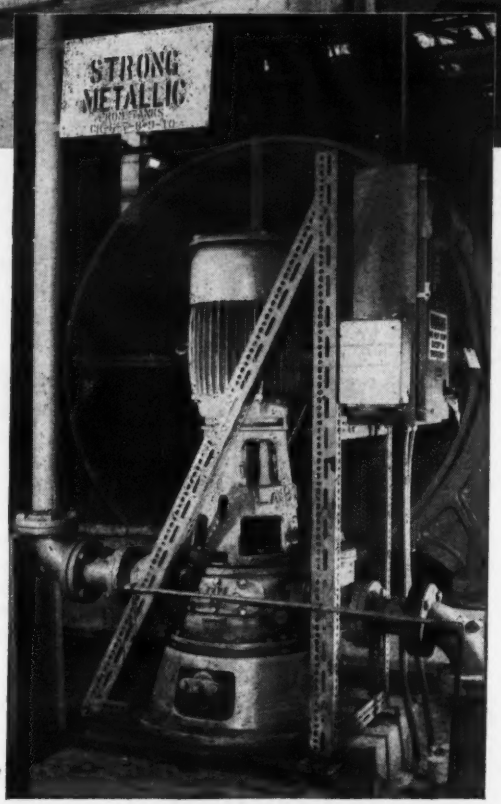
Allis-Chalmers pump experts will be happy to tell you about this new addition to an outstanding line. Contact your A-C representative or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

Plan to stay ahead... MODERNIZE

A-1163-C

A-C ALLIS-CHALMERS





Daily Job:

Move a Million Gallons of Corrosive Liquids

Industrial waste treatment at this large automotive manufacturing plant calls for neutralizing 1,500 gallons of noxious solutions per minute. Some 150 LaBour pumps handle the cyanide, metallic acids, alkali and other corrosive liquids involved in cleaning and plating operations. Every day more than a million gallons of such liquids are pumped.

Highly satisfactory performance of the LaBour pumps is reported by the operating staff. The pumps are packingless, and maintenance is at a minimum.

Your problems with corrosive liquids may be different, but you can depend on LaBour to solve them. Competent application advice is yours for the asking. Write us today.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.

Check 4144 opposite last page.

Continuous borane monitoring in .01-ppm concentrations

Uses: Detection of air-borne boranes.

Features: Boranes at concentrations of less than .01 ppm can be monitored continuously by analyzer.

Description: Detector cell, contained in sampling head at point of measurement, consists of pyridine-pyridinium chloride scrubber, containing iodide and small amounts of iodine. Iodine is reduced to iodide by boranes in air, drawn through cell by small motor-driven diaphragm pump. Diborane, decaborane and pentaborane react in this way with iodine.

When iodine concentration drops to pre-set level, pair of amperometric indicating electrodes activates generating electrodes through meter relay and instrument circuitry. During predetermined time cycle, fixed quantity of new iodine is formed in solution. Number of iodine-forming cycles/unit-time is function of borane concentration in air.

Two types of measuring instruments are available for use in central control room. In one, digital-counter type is actuated. Number of cycles counted in measured period of time indicates average borane concentration in air. In second type, detector signals are applied to conventional potentiometric recorder, showing average concentrations in three-minute intervals. This gives variation of concentration over long periods of time.

(Continuous borane analyzer is product of Mine Safety Appliances Company, Braddock, Thomas & Meade Sts., Pittsburgh, Pa.)

Check 4145 opposite last page.

Aluminum welding survey of techniques using gas-shielded metal-arc and tungsten-inert-gas processes is contained in 120-page booklet, illustrated with 100 photographs, charts, and detailed diagrams. Form ADI 1258—Air Reduction Sales Co., Div. of Air Reduction Company, Inc., 150 E. 42nd St., N. Y. 17, N. Y.

Check 4146 opposite last page.

FMC Chemical Divisions

From page 29

tion of the Charleston, West Virginia, plant (the Chemical Divisions' largest). Acquired in 1948 with other Westvaco facilities, the plant was soon regarded as almost obsolete. A 5-year modernization program was undertaken in 1953, applying the following key principles:

- New processes in place of obsolete
- Control centralization, with maximum automatic instrumentation
- Continuous processing wherever possible
- Land and building area conservation
- Largest available equipment in place of multiplicity of small units
- Pollution control
- Improve working conditions
- Increase productivity
- Maintain maximum uninterrupted production during changes

Whatever field of operation has been the object of FMC Chemical Divisions' management team, sound technological evaluation has always been the cornerstone for decision and appropriation.

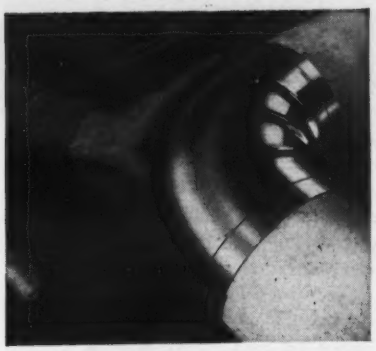
It is also clear that such practice grew from the ability — almost the genius — of Carl Prutton to show the way technologically — himself being a top technologist. In addition, he has set up a management team consisting of a relatively youthful Chemical Divisions Executive Committee backed up by a group of Division managers whose ages range from 35 to 52*. In this group of people he has instilled an unusual combination of aggressiveness combined with progressive attitudes.

And so today, FMC Chemical Divisions' management team is a tightly knit and enthusiastic group which is more than ever sensitive to the importance — along with the advanced technology — of good human relations practices.

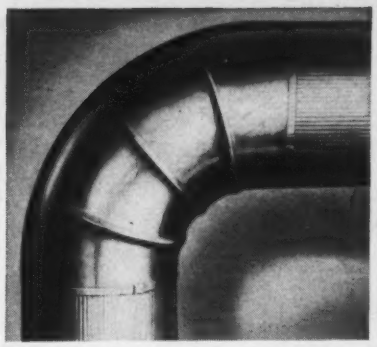
With so much accomplishment behind him, one might easily wonder what Carl

*D. H. Nelson (Becco), R. J. DeLargey (Westvaco Chlor-Alkali), R. F. Moran (Westvaco Mineral Products), S. H. Bear (Niagara) and H. S. Winnicki (Chemicals and Plastics).

9:00 A.M. Workman places two halves of Ell-Jac over insulated elbow. Halves of Ell-Jac are held in place with wire while holes are drilled for sheet metal screws.



9:04 A.M. Screws are quickly inserted to hold Ell-Jac snugly and permanently in place. Childers Aluminum Ell-Jacs come in 60 standard sizes for both 90° and 45° long radius elbows.



9:06 A.M. Ell-Jac completely installed. When straight line aluminum weather-proof jacketing is added, lines have complete, maintenance-free protection for all costly insulation.

How New Childers Ell-Jacs Save You Time and Money

Revolutionary new Childers Ell-Jacs go on fast and easy . . . fit perfectly . . . cut installation costs . . . never need painting . . . and, used with Childers Jacketing, give your insulated lines that well-dressed look from end to end.

Now, aluminum elbows are made in a wide range of sizes by America's leading manufacturer of aluminum jacketing. Childers Aluminum Ell-Jacs are available for quick, easy application to protect costly elbow insulation.

Childers Ell-Jacs are two-piece, deep drawn from .020" aluminum, #3003 alloy. They are precision-formed for long-radius elbows and come in 60 sizes for both 90° and 45° ells.

Childers Ell-Jacs, together with Childers Jacketing, now let you install maintenance-free aluminum over every square foot of your valuable insulation. You protect *all* of your insulation investment at lowest cost. You get the bonus of a better looking plant and easier housekeeping.

Positive weather-proofing with Childers Jacketing is assured by exclusive Childers Lap-Seal (Patents Pending). You're sure of getting proper lap without waste. You save labor, too.

Factory attached moisture barrier protects both Childers Jacketing and Childers Ell-Jacs against corrosion that could otherwise damage the underneath side of the aluminum. Its slight extra cost is more than offset by savings in application labor.

You also get greater strength and greater protection because Childers Jacketing is cross-crimped. Cross-crimping increases the vertical strength and rigidity of a .016" sheet to that of a plain .024" sheet.

It's easy to install Childers Jacketing. All you need are pliers and screwdriver, plus inexpensive strapping. Two men can do the job. Jacketing can be removed for inspection of the lines, then reapplied without waste.

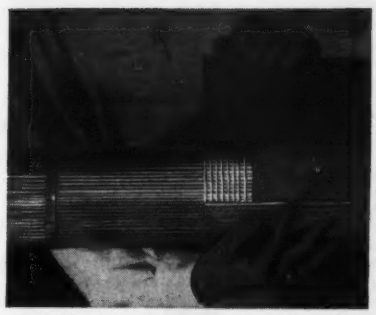
First cost is less for Childers Jacketing than for any other permanent type weatherproofing—even less than some temporary coverings.

You end maintenance worries, too, by using Childers Aluminum Weather-proof Jacketing and Ell-Jacs. Aluminum *keeps* its new look; needs no expensive periodic repainting.

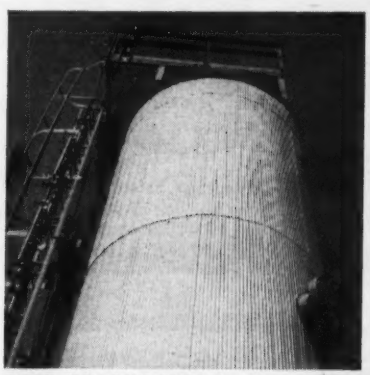
Why not benefit from Childers world-wide experience when you buy insulation for your lines, towers, vessels, and tanks? More than 2,000 petroleum refining, petro-chemical, and chemical plants will endorse your decision. Childers Engineering Representatives, located in 27 major industrial centers, give professional advice on insulation jacketing.

For a free sample of Childers Aluminum Weather-Proof Jacketing, with engineering data on how to safeguard your insulation, write Childers Manufacturing Company, Dept. CP-20, P. O. Box 7467, Houston 8, Texas.

In Canada, write direct to Peerless Mfg. Co., Sub-Post Office 28, Calgary, Alberta.



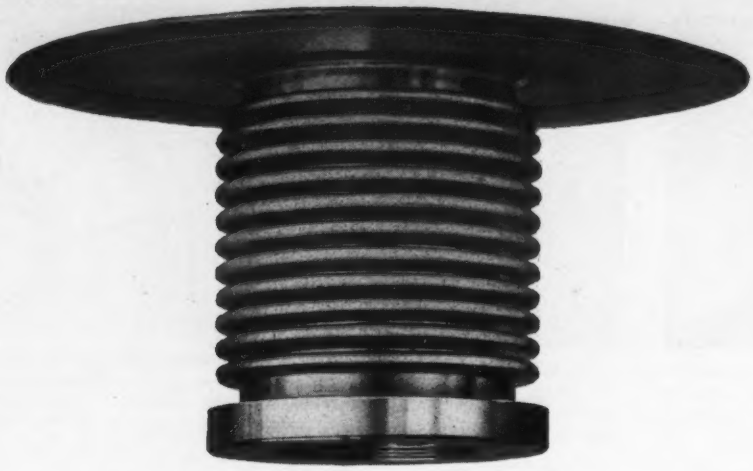
EXCLUSIVE LAP-SEAL, available at no extra cost, is a series of 8 ribs rolled into the underlapping edge of the jacketing, providing an automatic measure of the 2" circumferential lap. Proper lap is assured without waste. Labor is saved. Where desired, a positive weather seal is easily made with Lap-Seal and a mastic.



DEEP CORRUGATED Childers Jacketing in 1¼" and 2½" corrugations is recommended for permanent protection and improved appearance of insulated towers, vessels, tanks. Deep Corrugated Jacketing with factory-attached moisture barrier is another product available only from Childers.

Only Childers makes available to you complete specifications and engineering data on aluminum jacketing in these catalogs: Sweet's Industrial Construction File pp. 10b/Ch; Chemical Engineering Catalog pp. 1011-1014; Refinery Catalog pp. 317-320.

Check 4147 opposite last page.



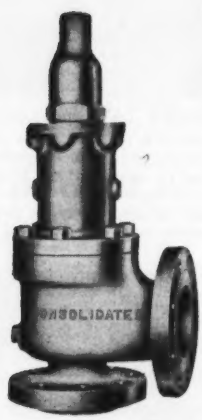
CORRUGATED SLEEVE

shields working parts

A durable, two-ply stainless steel Sealing Bellows in Consolidated Safety Relief Valves isolates contaminants, corrosion or viscous fluids from the working parts. The Bellows is balanced with the seating surface. Capacity is less affected by variable back pressure, so you can use smaller discharge piping and reduce the cost of pressure-relieving systems.

Full-rated relieving capacity is certain at all positions of the single blowdown adjusting ring because a fixed maximum secondary orifice provides full lift at 10% overpressure. Even with superimposed back pressure in the relieving system, valve action is consistently positive.

Protection of working parts is but one of many reasons why Bellows Type Consolidated Safety Relief Valves assure absolute protection for personnel and facilities. Write for details, including facts about the Standard valve that you can convert to the Bellows type in your own shop. Ask for Catalog 1900.



Consolidated Safety Relief Valve with Sealing Bellows. Type 1900-30 Series, Sizes: 1½" x 2" to 8" x 10".

MANNING MAXWELL & MOORE INC. TRADE MARK

CONSOLIDATED SAFETY RELIEF VALVES

A product of

MANNING, MAXWELL & MOORE, INC.

Consolidated Ashcroft Hancock Division • Tulsa, Oklahoma
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Check 4148 opposite last page.

FMC Chemical Divisions

From preceding page

Prutton has next in mind as a project for his energies. "We're pretty busy lining up plans for another major go at capital expansion," he told us, with such an understanding look that for a moment we almost felt like we, too, were a part of his team . . . .

Depreciation and Taxes

From page 30

Where are we going to get the money? Certainly not from our depreciation allowances. What we need is a new tax rule which will allow us to recover, through depreciation allowances, the original investment in terms of current purchasing power. The recovered capital could then be used to replace worn out and outmoded equipment.

If no relief is given, there are three alternatives:

1. Raise prices to recover the difference between depreciation allowances and the actual cost of replacement. But this can only increase the inflationary spiral and, in the long run, make things even worse than they are.

2. Neglect needed replacements, make do with outmoded equipment, work harder and longer with this outdated equipment, reduce the size and scope of operations and try to live with the inadequate depreciation allowances the tax law now permits. Naturally, the business will contract, so will the number of jobs, and so will profits.

3. Raise the money from a combination of borrowing, retaining more earnings by reducing dividends, and by taking painful measures to reduce wage costs. As for borrowing —debt never solved any problem and often has created new ones. Corporate earnings have been the only significant element in the economy which hasn't moved upward in the last 10 years; if corporations retain more earnings by reducing dividends, they will drive away investors and send into hiding the money we need to expand or operate. Reduce wages? That's a distressing

prospect and I hope we won't have to face it.

Many foreign countries, with less industrial capacity and technology, have recognized the strait jacket of original cost depreciation in an inflation economy and have, in whole or in part, met the problem of current value depreciation. These countries are contributing to their national industrial growth and they are presenting our industrial plant investment with increasingly severe competition.

There is another danger built into this unwise policy. The whole thing is inflationary. Every manager and owner knows that if he wants to stay in business he will have to replace or modernize his facilities some day.

He also knows that new equipment will cost more than it formerly did. He will, therefore, try to get as much as possible from his customers in the form of price increases. But, with the present tax structure, in order to get an extra dollar to replace equipment, he must earn $2.08. And, to get this sum, he must raise his prices accordingly. What could be more inflationary?

I wonder how long industry can hold out against these pressures? By the simple and equitable change in legislation to allow current value depreciation for tax purposes, these inflationary pressures can be avoided.

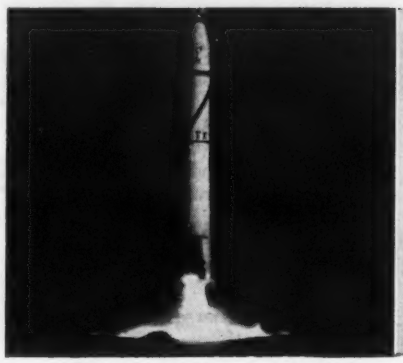
Here's A Challenge

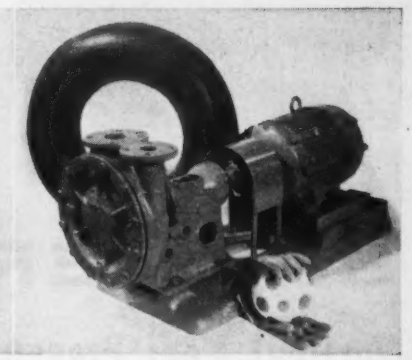
Uncle Sam's depreciation and tax policy is called unsound and unwise by our author. How would you change policy and law? Do you have a plan for convincing Congress that a change is necessary? We welcome your concrete proposals, will publish the most pertinent, and will send them to Washington. You can help make corporate tax laws more realistic.

— The Editors

PUMPAGE

Goulds news about pumps for process industries





Rocket's red roar

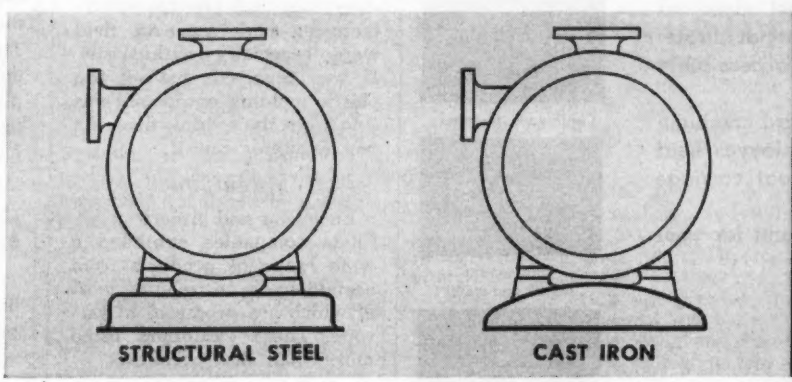
After the countdown—a roaring and soaring! The fuels that make rockets roar contain highly abrasive solids, ignite and burn rapidly with the slightest contact with air or oxygen. Handling them is a problem—pumping temperatures run as high as 550° F. For one government installation, Goulds developed a vertical process pump with an inert gas chamber that is used as a barrier between pumpage and rotating shaft seal. Gas pressure is maintained by an automatic purgerator slightly above suction inlet pressure to insure no contact between the mechanical seal and the abrasive solids. This pump has been found so broadly applicable that it is now a standard model in our line.

Now . . . a centripetal pump!

A unique use of centripetal action lets Goulds Fig. 2520 handle liquid, air, or liquid *and* air! The centrifugal force of the impeller separates the liquid from the lighter air, which accumulates at the center of the impeller and casing. The liquid, circulating at the casing periphery, is directed (by centripetal action) toward the center, pushing the air ahead of it and through the discharge. Once primed, this pump *stays* primed! It can't air bind—even with loops or leaks in your suction line. Handles foaming solutions and emulsions easily. You can use it for almost anything: as a scavenger, for transfer work, for cleaning up, for pilot plant work. Ask for Bulletin 725.6 for all the details!

Latex: Handle with Care

Before synthetic latex can become the bouncy consumer products you see here, it must be a fairly instable liquid, able to gel or coagulate easily. For that reason, a pump must handle latex gently or the impeller will clog and have to be cleaned frequently. Such a pump is the Goulds Fig. 3715—six of which are presently being used by a rubber manufacturer to transfer latex from storage tanks to tank cars and in the latex concentrator line. A semi-open impeller allows a minimum of mechanical shock or friction at optimum efficiency. Normal cleaning operations are performed easily, because the casing cover and impeller can be easily removed without disturbing pipe connections. Bulletin 725.4.



Cast-iron bedplates

A rigid well-grouted bedplate under your pump and driver is the first requirement for trouble-free operation. Accordingly, Goulds furnishes rigid corrosion-resistant cast-iron bedplates as standard at no extra cost. The Goulds special camber top prevents accumulation of corrosive liquids. The camber design with its large accessible grout hole at the high point insures complete fill-up of bedplate cavity with grout. This economical design, jig-drilled for pump and motors, provides integral motor pad, eliminating costly separate motor base.

Get all the news monthly — FREE!

If you've liked reading about the new designs and applications of pumps as presented on PUMPAGE, then you'll appreciate getting a sister publication, GOULDS NEWS, mailed to you free every other month. GOULDS NEWS is a 4-page newsletter that highlights new developments in pumps and profitable ways that they are used. You can add your name to our mailing list by merely writing, on your letterhead, to Goulds Pumps, Inc., Dept. CP-99, Seneca Falls, N. Y.

GOULDS PUMPS

Check 4149 opposite last page.

Engineered to improve processing

SHRIVER

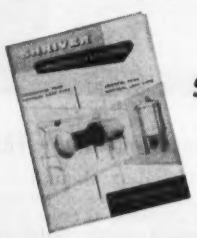
Vertical Leaf Pressure Filter offers outstanding operating efficiency

- *For large volume clarification*
- *For high filtration efficiency*
- *For quick discharge of solids and easy cleaning*

The Shriver "HTVL" horizontal tank vertical leaf pressure filter provides the maximum in performance. It incorporates the most advanced design features to assure perfect clarity of filtrate; uniform, reasonably dry cake; easy accessibility for cleaning and compactness.

The filter is available in 27 standard combinations of tank size and number of filter leaves. Leaf assembly, filtrate discharge and leaf carriage simplify operation.

There's a Shriver "HTVL" filter unit for your needs—now or projected.

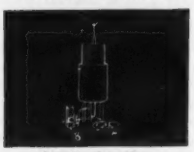


Send for handy Bulletin 146 which tells all you'll want to know about the filter for better filtration.

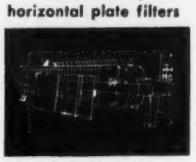
Filter presses

Horizontal tank, vertical leaf filters

Vertical tank, vertical leaf filters



Vertical tank, horizontal plate filters



Plastics polymerizers and slabbers

Continuous thickeners

Filter media textile and metal

Diaphragm pumps

T. SHRIVER & COMPANY, INC.
846 HAMILTON STREET • HARRISON, N. J.
SALES REPRESENTATIVES IN: Atlanta, Ga. — Buffalo, N. Y. — Chicago, Ill. — Detroit, Mich. — Houston, Tex. — Los Angeles, Cal. — St. Louis, Mo. — San Francisco, Cal. — Montreal, Que. — Toronto, Ont. — Mexico City, Mex.

Check 4150 opposite last page.

Salon de la Chimie

From page 31

this arrangement as it speeded their coverage of the show, based on their specific interests.

Of the 300,000 square feet of exhibit space, 25% was devoted to chemicals; another 25% to rubber and plastics. Laboratory and instrumentation required 20% of the space; processing equipment and corrosion control 25%; and heating and heat-exchange equipment the balance.

Visitor Interest

Synthetic fibers, plastics, and fluorocarbons attracted the greatest interest in the chemical exhibits. These products appear to have the greatest rate of growth.

A new method of achieving resistance to distortion of a cellulose acetate was shown. After gamma-ray treatment, the product withstands a temperature of 150°C in dry atmosphere without distortion.

Low-pressure polyethylenes, polyester resins, and a complete line of plastic pipe and fittings showed the direction in which the European chemical industry is developing.

Exhibitors in the plastics, chemicals, and plastics-manufacturing-equipment field were especially enthusiastic. It was reported that all the plastic molding equipment was sold from the exhibit floor. As one exhibitor put it:

"Magnifique"

European and American affiliate companies exhibited a wide range of products from acetaldehyde to zeolite, most of which are produced in Europe. These exhibitors listed more than 600 chemicals.

Laboratory and Instrumentation

Interest in measurement and control was high. For the laboratory, chromatography and spectroscopy were of greatest interest.

Electronic instruments in miniature cases, paralleling American developments, were shown for the first time.

Development of electronic equipment is being paced by

SERV-RITE DRILLED WELLS

thermometer sockets
thermometer test wells
thermocouple wells

FOR PLUS SERVICE

SERV-RITE drilled protecting wells are made in types, lengths, and of alloys to meet any temperature and pressure condition in vessels and flow lines.

Every well is carefully made to assure a plus service. Selected bar stock is machined to within accurate limits. Bore concentricity is held within 5% of wall thickness, depending on well length. They are tested to withstand pressures up to 3000 psi., depending on the wall thickness. Exterior surface has a mirror-like finish for minimum resistance to flow in lines.

Complete assemblies can also be furnished with suitable thermocouple, head, flange, fittings, etc.

Give SERV-RITE a trial on your next drilled well requirements. There is none better.

Write for Bulletin No. 2000
for specifications, size, and ordering information on SERV-RITE drilled wells.

8640

CLAUD S. GORDON CO.
Manufacturers • Engineers • Distributors

603 West 30th Street, Chicago 16, Illinois
2031 Hamilton Ave., Cleveland 14, Ohio

Check 4151 opposite last page.

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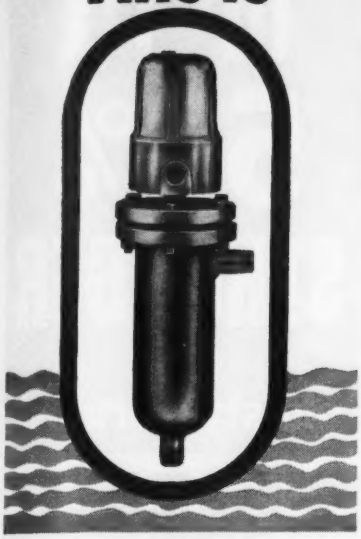


LEVEL MASTER®

The UNFAILING Liquid Level Control!

The ability to function with *continuous, sensitive control* with liquids is the standout feature of Level Master. The "brain" of Level Master is the unique Bell Magnetic Proximity switch incorporating a permanent Alnico V magnet that responds instantly to changes in liquid level!

- *Models for all types of liquids.*
- *Horizontal, vertical, external mountings.*
- *Precision engineered for long life operation.*

For full information consult your Level Master representative or write directly to:

JO-BELL PRODUCTS, INC.

5456 W. 111th St. • Oak Lawn, Ill.

Phone GArden 5-0240

Jo-Bell Products, Inc. Dept. B
5456 W. 111th St., Oak Lawn, Ill.
Send full information on Level Master and name of nearest representative.

My name_____

Company_____

Address_____

City_____ Zone____ State____

Check 4152 opposite last page.

U. S. activity, but European progress is quite rapid. Future, according to one spokesman, lies in development along electronic lines, combined with the use of pneumatic and hydraulic control. Data loggers were shown and computers for process control were being discussed.

The subject of automation is one which the French particularly are not discussing emphatically . . . due to the present economic conditions and the possibility of unfavorable reaction on the part of workers, who might interpret its use as a means of eliminating jobs. Thus the benefits of automation are discussed in terms of improved operations rather than elimination of manpower.

Processing Equipment and Corrosion Control

Coatings, plastic pipe and fittings, and processing equipment were well received. Just as corrosion is a problem in America, it is also of importance in Europe. Centrifuges, pumps, mixing equipment, reactors, filters, and complete processing units were shown in this category.

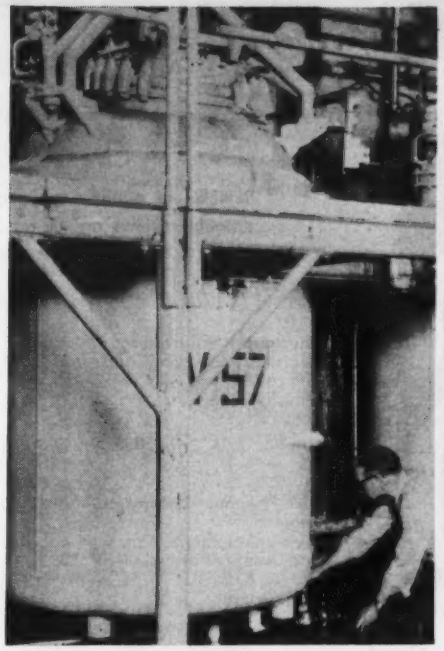
Boilers, Air Pollution

Package boilers, while well known in the States, were examined with interest because of their novelty in Europe. Problem of air pollution is getting more serious attention; thus exhibits devoted to this topic were of interest.

Conclusion

As in all exhibits of this type, reactions were mixed. Some were enthusiastic, others were not. It was well done, colorful, and highly interesting.

Water-pollution-abatement laws, both federal and state, are outlined in a recently published compendium. Copies of Manual W-5, "Compendium of Water Pollution Laws," are available for $5.00 each from the Manufacturing Chemists' Association, Inc., 1825 Connecticut Ave., N. W., Washington 9, D. C.



FLUIDICS AT WORK

IN LAB, PILOT PLANT, OR PRODUCTION

Why all your corrosive reactions should be done in a single material—GLASTEEL

When you work with corrosive acids and/or mild alkalies, you can eliminate the variables of process environment by using Glasteel reactors *all the way* from research to pilot plant to full-scale production.

You can get Glasteel reactors with 1-gallon capacity or as large as 4000 gallons . . . all made from Glasteel 59, which resists all acids (except hydrofluoric) and all the mild alkalies.

Glasteel 59 reactors also give added insurance against thermal shock . . . 30% more resistance than the best previous glassed steel. Operating temperatures to 450° F.

Lab Sizes: 1, 2, 3 gal. From vacuum to 750 psi.
P Series: 5 to 100 gal. 25 psi; 150 psi also available through 50 gal.
E Series: 50 to 2000 gal. 25, 50, and 100 psi through 750 gal.; 75 psi on larger sizes.
R Series: 300 to 4000 gal. 100 psi.

Popular sizes are pre-stocked for ten-day delivery.

Alloy reactors. A complete line of reactors is available in stainless steel and other alloys to solve specific corrosion problems.

Wonder metals. Need a reactor of tantalum, titanium or zirconium—lined or solid? Pfaudler Permutit craftsmen are skilled in fabricating these metals, as well.

New FLUIDICS Buyer's Guide. You can get more specific data on these reactors and other products and services offered under the FLUIDICS program for solving problems involving fluids. Write our Pfaudler Division, Dept. CP-99, Rochester 3, New York for a copy of Bulletin 980.

FLUIDICS is a Pfaudler Permutit program which provides a modern, imaginative approach for handling and processing more profitably liquids and gases.

PFAUDLER PERMUTIT INC.

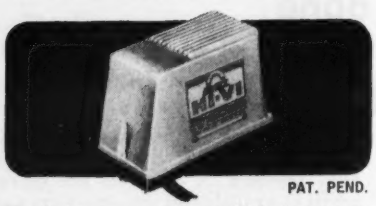
Specialists in FLUIDICS . . . the science of fluid processes

Check 4153 opposite last page.

UNSTICK stuck BINS

with new electro-permanent magnetic

ERIEZ HI-VI VIBRATORS



PAT. PEND.

Here's the newest and most efficient answer to those hard-to-move materials in sticky bins . . . designed to provide superior operating efficiency . . . exclusive pinpointed vibration gets right to the trouble spot – starts stubborn materials moving!

NO RECTIFIER NEEDED • COMPLETELY ENCLOSED HOUSING • GREATER VIBRATION IMPACT THAN COMPARABLE SIZE UNITS • RUGGED AND DURABLE • LOW FIRST COST • LOW OPERATING AND MAINTENANCE COST.

Special Mill Mutual ACCEPTED Units for HAZARDOUS DUSTY LOCATIONS

GET THE WHOLE STORY . . . WRITE TODAY
Eriez Mfg. Co., 73-WA Magnet Dr., Erie, Pa.

ERIEZ

Check 4154 opposite last page.

new literature

Reviews of publications pertinent to the industry. Additional reviews are found throughout other sections of this magazine

Thermistor controllers, which are transistorized, are presented in two-page Bul MC-179—Fenwal Incorporated, Pleasant St., Ashland, Mass.

Check 4155 opposite last page.

Fire-resistant lubrication for air compressors is covered in four-page pamphlet, "Lubrication for Air Compressors" — E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Check 4156 opposite last page.

Conveyors—Oscillating and vibrating conveyors have their specifications given and features and uses enumerated in illustrated four-page Bul VB-95—Prab Conveyors, Inc., 30121 Groesbeck Hwy., Roseville, Mich.

Check 4157 opposite last page.

High-pressure gages are itemized along with specifications and photographs in six-page High-Pressure Gage Cat—Rochester Manufacturing Company, 100 Rockwood St., Rochester 10, N.Y.

Check 4158 opposite last page.

Fittings and flanges made of stainless steel are shown in six-page Pipe-Mate Bul—Tube Turns Division of Chemetron Corporation, Louisville 1, Ky.

Check 4159 opposite last page.

Fast-cure epoxy systems and spray equipment are introduced in 9-page Epoxy TR 7—Union Carbide Plastics Company, division of Union Carbide Corporation, 30 E. 42nd St., New York 17, N. Y.

Check 4160 opposite last page.

Drain valve, of flush-bottom type which is designed not to clog up, is one of the items mentioned in Drain Valve Cat — Strahman Valves, Inc., Nicolet Ave., Florham Park, N.J.

Check 4161 opposite last page.

Impact milling, particle-size reduction, and vibrating screens are considered in literature available from Entoleter, Division of Safety Industries, Inc., Box 904, New Haven, Conn.

Check 4162 opposite last page.

Strapping aid—An overhead tool mount for suspending steel strapping tools, keeping plant floor clear, is discussed in folder. Mount permits tool to be moved horizontally as well as vertically. Folder AD-290—Acme Steel Company, 135th St. & Perry Ave., Chicago 27, Ill.

Check 4163 opposite last page.

Nitration processes and other chemical processes developed by German engineering firm are detailed in nine-page J. Meissner booklet—Girdler Construction Division, Chemetron Corporation, PO Box 174, Louisville 1, Ky.

Check 4164 opposite last page.

Aluminum bins, which can be used in inter- or intra-plant applications, are presented in Invert-a-bin Literature — The Powell Pressed Steel Company, Hubbard, Ohio.

Check 4165 opposite last page.

Teflon hose and fittings for hose are delineated in 65-page catalog, including complete description of hose and fittings, along with assembly instructions and applications ideas. Cat 104—Aeroquip Corporation, Jackson, Mich.

Check 4166 opposite last page.

Fatty nitrogen chemicals are reviewed and uses suggested in Synopsis of Fatty Nitrogen Chemicals Seminar—Chemical Division, General Mills, Inc., S. Kensington Rd., Kankakee, Ill.

Check 4167 opposite last page.

Industrial air compressors (A-73) and air-cooled compressors (A-56) are reviewed in 11-page and 16-page bulletins, respectively. Buls A-56 and A-73—Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.

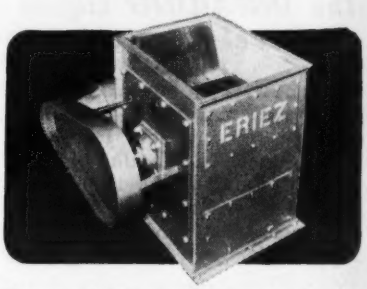
Check 4168 opposite last page.

Electric-truck performance is documented with stopped-motion photos and graphs showing production speeds and use of power in Bul 6226 and 6248—Exide Industrial Division, The Electric Storage Battery Company, Rising Sun and Adams Ave., Philadelphia 20, Pa.

Check 4169 opposite last page.

UP TO 50% STRONGER than old-style drums!

ERIEZ non-electric MAGNETIC DRUMS



New, expanded line provides more magnetic power, increased protection! For automatic continuous removal of medium fine iron and tramp iron from foods, grains, plastics, rubber, ceramics, etc. Protects machinery, prevents fires and explosions, eliminates product contamination. Quickly, easily installed at discharge end of chutes, spouts, screw conveyors, etc. *Now with replaceable shell and bearings to eliminate costly maintenance problems!*

MAGNETIC POWER GUARANTEED INDEFINITELY – NO LOSS OF MAGNETIC STRENGTH WHEN OPERATED IN HIGH OR LOW TEMPERATURE INSTALLATIONS – Non-electric; no wires, attachments or fuses – No operating or maintenance costs – For wet or dry materials – Self-cleaning – With or without housings – Adjustable magnetic element; easy drum removal – Wide range of models and sizes.

WRITE TODAY FOR DESCRIPTIVE LITERATURE INCLUDING INSTALLATION AND APPLICATION INFORMATION
Eriez Mfg. Co. 73-WB Magnet Dr., Erie, Pa.

ERIEZ

Check 4170 opposite last page.

NEW LITERATURE

Oxygen therapy in industry is treated in 12-page booklet, describing portable resuscitator line and allied equipment. Booklet NM-116—National Cylinder Gas, division of Chemetron Corporation, 840 N. Michigan Ave., Chicago 11, Ill.

Check 4171 opposite last page.

Organic chemicals are listed with description of properties, uses, and containers in Bul 4—Maumee Chemical Co., 2 Oak St., Toledo 5, Ohio.

Check 4172 opposite last page.

Process-gage illuminators, incorporating solid-wedge-lighting principle, are treated by a Data Unit — Jerguson Gage & Valve Company, 100 Adams St., Burlington, Massachusetts.

Check 4173 opposite last page.

Nickel tube composition, physical constants, and mechanical properties are listed in Folder CM-359—Superior Tube Company, 1512 Germantown Ave., Norristown, Pennsylvania.

Check 4174 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Torque is topic of 28-page manual, which discusses various types of torque wrenches and adapters and gives various torque formulas. Torque Manual — P. A. Sturtevant Co., Addison, Ill.

Check 4175 opposite last page.

Fork lift designed for outdoor or in-and-out service with two-ton capacity is described in two-color bulletin. "Utility Fork Lift"—Utility Sales Division, J.I. Case Co., Racine, Wis.

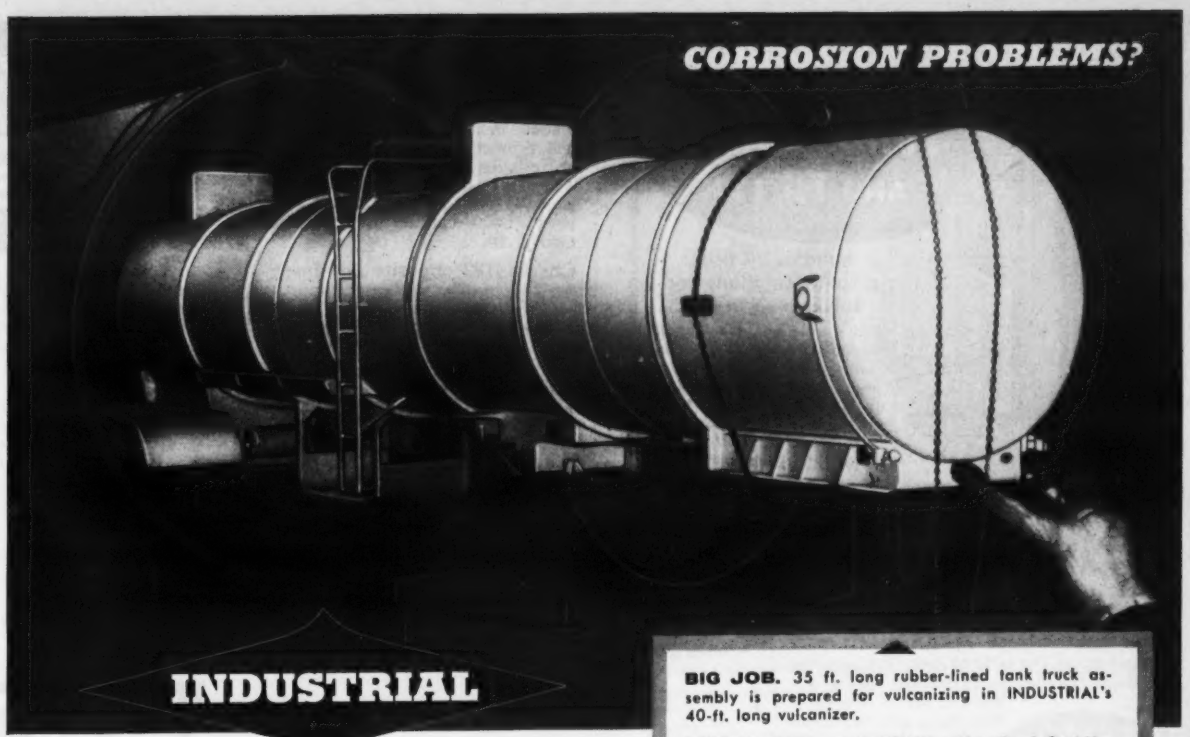
Check 4176 opposite last page.

Flash drying systems are dealt with in Cat 82 — Raymond Division, Combustion Engineering, Inc., 1116 W. Blackhawk St., Chicago 22, Ill.

Check 4177 opposite last page.

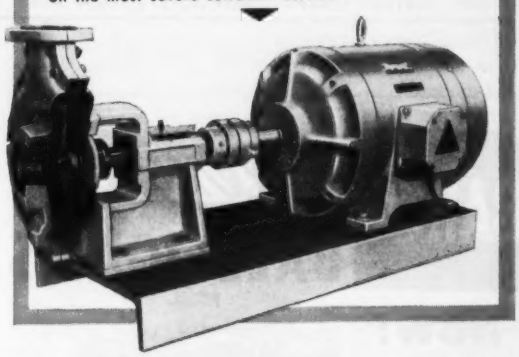
Carboxy vinyl polymers information is brought up to date with reports on new tests in Carbopol 934 Bul, Supplement 1—B. F. Goodrich Chemical Company, division of The B. F. Goodrich Company, 3135 Euclid Ave., Cleveland 15, Ohio.

Check 4178 opposite last page.



BIG JOB. 35 ft. long rubber-lined tank truck assembly is prepared for vulcanizing in INDUSTRIAL's 40-ft. long vulcanizer.

SMALL JOB. INDUSTRIAL rubber-lined Centrifugal Pumps give long life with minimum maintenance on the most severe corrosion service.



For Skilled Rubber Surfacing

. . . these complete facilities insure a *better* job at *lower* cost

INDUSTRIAL operates one of the largest rubber compounding and lining plants outside of the rubber industry. Here, tons of raw rubber are maintained in stock for formulating and compounding into compression molds and rubber linings to meet the *most specific* corrosion or abrasion-resistant services.

This extensive facility permits INDUSTRIAL to maintain the highest standards of quality control for rubber-lined processing equipment designed and built by INDUSTRIAL. In addition, it also provides a skilled, experienced and well-equipped source for *custom* sheet lining and compression molding to meet individual requirements.

All the benefits of INDUSTRIAL'S experience in designing, engineering and producing rubber components, and for applying it to the most intricate surfaces, is described in our RUBBER DIVISION bulletin. Write for your copy, today.

INDUSTRIAL Centrifugal Pumps are specifically designed for rubber lining. **As a result, they characteristically provide long, trouble-free life in corrosive or abrasive service . . . offering these design benefits:**

- **Mechanical Seal or stuffing box**
- **Easy access to pump seal**
- **Quick adjustment of impeller clearance**
- **Teflon seal cage (stuffing box only)**
- **Impeller insert welded to shaft**
- **One-piece, maintenance-free rotating element**

INDUSTRIAL

INDUSTRIAL FILTER & PUMP MFG. CO.
5908 Ogden Avenue,
Cicero 50, Illinois

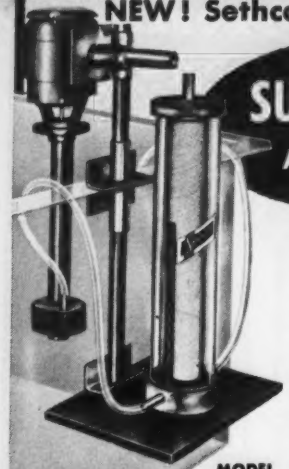
C-159

Check 4179 opposite last page.

NEW! Sethco corrosion proof

SUMP PUMP AND FILTER

handles all acid, alkaline solutions and solvents up to 250°



MODEL UAL-20
200-300 Gals./Hr.

Self - priming, leakproof Epoxy sump pump provides continuous duty performance. Bracketed inside the tank, it requires no floor space. Outside bracket supports High Temp. Lucite or Epoxy filter chamber . . . resistant to all corrosive solutions and solvents. ½ or ¾ HP motor. Pump and filter chambers are available separately.

Complete details on Sethco Specification Sheet No. 751

WRITE for NEW illustrated 8 Page Brochure . . . complete line of SETHCO FILTER PUMP UNITS (50 to 2700 Gals./Hr) providing Depth Filtration for all chemical applications. Includes special informative 'Filter Pump Selection Guide'

Sethco

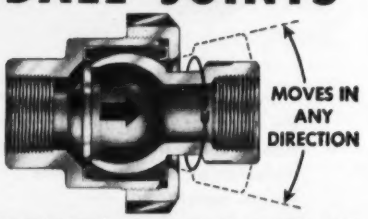
MAyfair 3-4220

2287 BABYLON TURNPIKE, MERRICK, L. I., NEW YORK

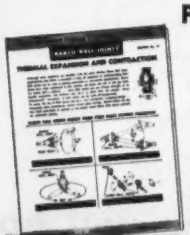
Check 4180 opposite last page.

BARCO *Flexible* BALL JOINTS

NOW! An easy way to solve



PIPE EXPANSION PROBLEMS



Send for New Bulletin No. 31

Barco Flexible Ball Joints make it easy and economical for you to solve many problems where piping EXPANDS and CONTRACTS!

- **No heavy pipe anchoring required. No "end thrust" developed under pressure. Minimum space needed.**
- **Ability to handle compound movement where twisting is also involved.**
- **Virtually no deterioration. Able to stay in service for years. No lubrication.**
- **Maximum safety for high temperature and pressure. Sizes ¼" to 12".**

Read interesting Bulletin 31, "How to Solve Piping Flexibility Problems". Complete with piping layout drawings and illustrations. Shows how to cut costs, save time, and do a better job! *Ask for recommendations.* BARCO MFG. CO., 537K Hough St., Barrington, Illinois.

Check 4181 opposite last page.

NEW LITERATURE

Heat-exchanger tubes can be extended in life by use of plastic end protectors, available in nylon, polyethylene, and phenolic resin. They are depicted in four-page Bul P-335—Crane Packing Company, 6400 Oakton St., Morton Grove, Ill.

Check 4182 opposite last page.

Pulp-refiner plate design is reviewed in detail in eight-page Bul P-45—Sprout, Waldron & Company, 130 Logan St., Muncy, Pa.

Check 4183 opposite last page.

Processing equipment, including conveyors, compressors and vacuum pumps, coolers and preheaters, blowers, fans, and exhausters, is presented in 12-page Bul G-3C — Fuller Company, Subsidiary of General American Transportation Corporation, 100 Bridge St., Catasauqua, Pa.

Check 4184 opposite last page.

Control boards and how they are used to speed up design and production of rockets and missiles is told in 28-page booklet. Photographs and color-coded diagrams illustrate the peg-and-tape boards in use at Redstone Arsenal, Alabama. "To Speed Up Operations" — Wassell Organization, Inc., 225 State St., West, Westport, Connecticut.

Check 4185 opposite last page.

Ball valves of double-seal design, available in pipe sizes of ¼ to 8" in variety of materials, are depicted in Ball Valve Literature — Jamesbury Corp., 65 New St., Worcester, Mass.

Check 4186 opposite last page.

Electric fork truck with 4000-lb capacity and with extendable forks for narrow-aisle operation is detailed in four-page Bul 620—The Raymond Corporation, 329-176 Madison St., Greene, N.Y.

Check 4187 opposite last page.

Polyester-glass equipment in a wide range of corrosion-resisting applications is described in 28-page Cat P-11 — Pla-Tank Division, Haveg Industries, Inc., 900 Greenbank Road, Wilmington 8, Del.

Check 4188 opposite last page.

Packaging material—Four-page brochure details use of expandable polystyrene as a shock-absorbent and waterproof pack. Lightweight material also gives thermal insulation in packaging vaccines, drugs, nitric acid. Bul C-9-270—Plastics Division, Koppers Company, Inc., 801 Koppers Bldg., Pittsburgh 19, Pennsylvania.

Check 4189 opposite last page.

For fine Particle Size Retention Use Ertel Asbestos

FILTER SHEETS

Ertel sheets are available in ten uniform grades for all filters up to 25" square. Manufactured under rigid quality control—to meet Ertel standards for low leachable calcium and iron content.

No obligation for a trial run of Ertel sheets. Write for details!

NOW AVAILABLE New Charts & Technical Data

Write for Catalog 58, Today!

ERTEL

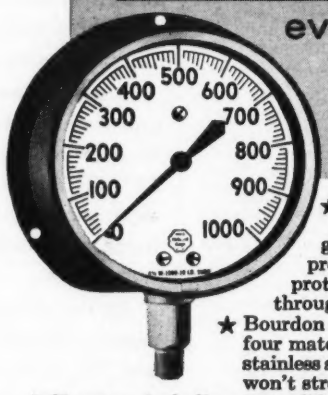
ERTEL ENGINEERING CORPORATION

Liquid Handling Equipment Manufacturers Since 1932

KINGSTON 3 NEW YORK

Check 4190 opposite last page.

Helicoid Gages give *Sustained Accuracy,* even on the toughest jobs



★ Exclusive Helicoid movement has no gears, no teeth. Shock-proof construction protects accuracy through millions of cycles.

★ Bourdon tubes available in four materials—bronze, steel, stainless steel, and K Monel—won't stretch, crack, or leak.

★ Six cases, including new solid-front safety case, meet every mounting requirement.

★ External pointer adjustment can't be jarred out of position.

★ A complete selection of gages and accessories for hydraulic, chemical, and other service.

Write for Catalog G-52.

HELICOID GAGES

Helicoid Gage Division

American Chain & Cable Company, Inc.

929-P Connecticut Avenue • Bridgeport 2, Conn.

ACCO

Check 4191 opposite last page.

NEW LITERATURE

Wrire cloth is expanded upon in Bul 10—The Cleveland Wire Cloth & Mfg. Co., 3577 E. 78th St., Cleveland 6, Ohio.

Check 4192 opposite last page.

Corrosion-proof bellows, for flexible and vibration joint service, molded of a virgin Teflon compound, are covered in Bul B-1A —Dept. 300, Resistoflex Corporation, Roseland, N.J.

Check 4193 opposite last page.

Skip-hoist dumpers for free-flowing material are pictured and described in eight-page Form CD-100—Conveyors & Dumpers Inc., 4 Stanley Rd., West Orange, N.J.

Check 4194 opposite last page.

Exchange system for heating or cooling corrosive solutions is introduced with photographs, drawings, and capacities chart in Bul 279 — Engineering Department, Falls Industries, Inc., Aurora Road, Solon, Ohio.

Check 4195 opposite last page.

Polyvinyl acetate of redispersible type in powder form is discussed in Bul PVB 303—Colton Chemical Company, Division of Air Reduction Company, Inc., 1747 Chester Ave., Cleveland 14, Ohio.

Check 4196 opposite last page.

Liquid heating systems are discussed in eight-page bulletin, incorporating drawings. Bul 02B9209 — Allis-Chalmers Manufacturing Company, 864 South 70th St., Milwaukee 1, Wis.

Check 4197 opposite last page.

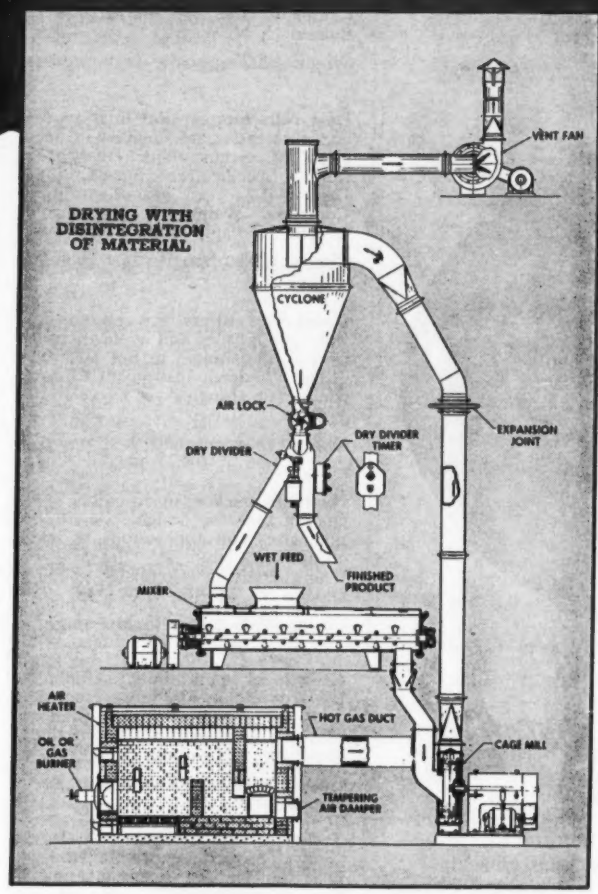
Blenders of all types are outlined in Bul 080B — Sturtevant Mill Co., 119 Clayton St., Boston, Mass.

Check 4198 opposite last page.

FOR HANDLING MANY SPECIAL PRODUCTS

C-E

Raymond CAGE MILL Flash Drying System



WHEN your problem involves the drying of any materials in finely divided form . . . with no pulverization necessary . . . then the Raymond Cage Mill Flash Drying System may offer advantages which will simplify the process and improve the product.

This equipment handles the material automatically throughout in a clean, safe, dust-free operation.

Drying action is almost instantaneous, and the small amount of material in the system at a time insures excellent control of final moisture. This is important in the case of synthetic resins, pharmaceuticals and other heat-sensitive materials.

The Cage Mill disintegrates the product to normal particle size, and delivers a uniform fluffy finished material of specified moisture content.

If pulverizing is required, the Raymond Imp Mill can be used in place of the Cage Mill.

Write for further details of this economical system, and tell us the requirements of your product.

For handling wet materials and thin slurries, a Mixer unit is provided for adding a portion of the dried material to the wet feed. This disperses the moisture and conditions the material for more efficient drying. Useful for processing treated clays, corn gluten meal, filter cake, etc.

Raymond CATALOG #82
"Flash Drying Systems"
will be sent on request.

COMBUSTION ENGINEERING, INC.
Raymond Division
1116 W. BLACKHAWK ST.
CHICAGO 22, ILLINOIS
SALES OFFICES IN PRINCIPAL CITIES
Combustion Engineering-Superheater Ltd., Montreal, Canada

Check 4199 opposite last page.

Absolute Line Shut-off

BY ONE MAN – IN ONE MINUTE!

HAMER *Visible Shut-off*
LINE BLIND VALVES

HAMER PLUG VALVES

Will not stick or freeze. Perfect for hard-to-hold fluids. Simple plug adjustment nut eliminates sticking

Hamer Line Blinds are unsurpassed for positive action, easy operation, long-life service and lasting safety. One man can open or blind a line in less than one minute, and there is nothing like a solid plate for a PERMANENT LEAKPROOF SHUT-OFF. Bar or handwheel operation eliminates wedges, hammers, wrenches needed for spreading conventional flanges. Removes fire hazard of sparking and stops damage to equipment.

Write for FREE catalog

Hamer VALVES
P. O. Box 1851
2919 Gardenia Ave., Long Beach 1, Calif.
Division of Chiksan Company

Check 4200 opposite last page.

NEW LITERATURE

Canned-type pumps for service to 5000 psi and 1000°F, are subject of "Request for Quote" Data Sheet — Chempump Division, Fostoria Corporation, Buck and County Line Roads, Huntingdon Valley, Pa.

Check 4201 opposite last page.

Wooden tanks, accessories, and hardware are discussed in three brochures, Wood Tanks Bul, Press Plates and Frames Bul, and Wood Tank Hardware Bul—Arrow Tank Company, Inc., 16 Barnett St., Buffalo 15, N. Y.

Check 4202 opposite last page.

Dust collectors of cloth-filter type and accessories are detailed in 36 pages of specifications. Dust-collector Specification Sheets — Dept. KP-2, Torit Manufacturing Company, Walnut & Exchange Streets, St. Paul, Minn.

Check 4203 opposite last page.

Count-rate meters are presented with data on uses and applications, circuits, and ranges in Bul 3025-9 —The Victoreen Instrument Company, 5806 Hough Ave., Cleveland 3, Ohio.

Check 4204 opposite last page.

Hydraulic packing information, including that for design, construction, sizes and applications, is incorporated into Bul P-333 — Crane Packing Company, 6400 Oakton St., Morton Grove, Ill.

Check 4205 opposite last page.

Centrifugal applications, including latest developments, are presented in Bul 2827—The Western States Machine Company, 1702 Fairgrove Ave., Hamilton, Ohio.

Check 4206 opposite last page.

Technical data pertaining to electricity, properties of materials, heat transfer and steam information, measurements, and other subjects are summarized with tables, formulas, and symbols in 120-page Booklet B-3677D—Westinghouse Electric Corporation, Box 2099, Pittsburgh 30, Pa.

Check 4207 opposite last page.

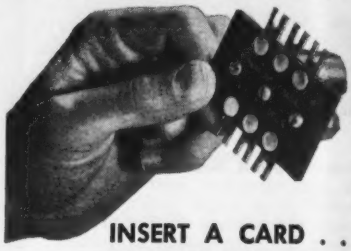
Pressure-indicating and test gages are pictured in four-page Brochure 500SF — Crosby Valve & Gage Company, Wrentham, Mass.

Check 4208 opposite last page.

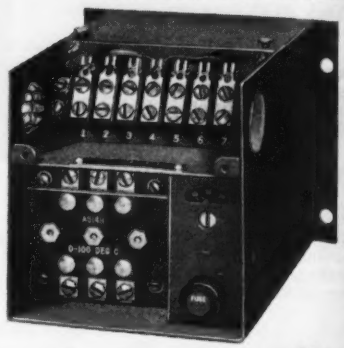
Air separation formulas are incorporated in Air Separation Booklet — Robert M. Gay Division, Universal Road Machinery Co., 117 Liberty St., New York 6, N.Y.

Check 4209 opposite last page.

Great things are happening in AutroniC® Control



INSERT A CARD . . . CHANGE THE RANGE



LOW-COST, HIGH-PERFORMANCE ELECTRONIC RESISTANCE THERMOMETER

Pick a temperature range between —50° and 700°F., or —50° and 350°C.; place the corresponding range card in the Swartwout thermometer adapter, and the temperature range is set up, ready to go.

Simple? You bet. Simplified design is the reason for the low price of the Swartwout Resistance Thermometer. It is also the reason for the unit's exceptional dependability.

Highly sensitive, the fully-electronic Swartwout Resistance Thermometer temperature system is adaptable to full-scale temperature spans as small as 3°F. It can indicate, record, or control. With slight modification, or auxiliary equipment, it will add, subtract or average temperature . . . even control the ratio between two temperatures, or between temperature and another variable.

All this is done with electronic speed. Data is transmitted instantaneously . . . no time-lag no matter where temperature elements are located.

The operational ease, functional flexibility and simplicity of the Resistance Thermometer are characteristic of the entire line of Swartwout AutroniC Instrumentation.

For details on the Resistance Thermometer, request Bulletin A-706-B. The Swartwout Co., 18511 Euclid Avenue, Cleveland 12, Ohio.

SWARTWOUT

. . . world leader in electronic process instrumentation

Check 4210 opposite last page.

Highly Intimate Blends in 1 to 2 Minutes

Blends while discharging; No segregation or flotation

Sturtevant Rotary Blenders start 4-way blending while charging, continue it during discharge, thus producing highly intimate, even blends of dry and semi-dry materials – within 3 to 5 minutes of start of charging.

Six *complete* blending cycles per hour are common. And Sturtevant's special action produces no particle reduction, cleavage or attritional heat – is highly effective yet gentle and safe even with explosives.

Receiving

Scoops cascade material as drum rotates. Movement forces material from both ends to middle. Thus blending is 4-way right from start of charging.

Discharging

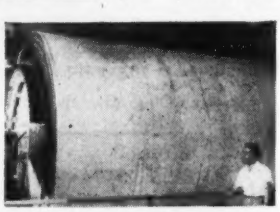
Single gate controls charge, discharge. Blending continues throughout discharge phase. Result is no segregation or flotation — highly intimate, even blends.

Self-cleaning, dust-sealed drum; one-man accessibility

Operation of Sturtevant Blenders is self-cleaning – drum interiors are completely dust-sealed. For inspection of all models, one man simply loosens a few lugs to remove manhole cover – quickly and easily.

Nine standard models with capacities to 900 cu. ft.

10 cu. ft. Sturtevant Blender at U.S. Steel Corp.'s new Applied Research Laboratory (Raw Materials Division) in Monroeville, Pa. This unit handles batches up to 500 lbs. — is ideal for pilot work and small runs.



One of four 450 cu. ft. Sturtevant Blenders at Celriver Plant of Celanese Corp. (Rock Hill, N. C.). These large units handle up to 20,000 lbs. batches — have a 9-year record of meeting the most exacting blending requirements.

Fully or semi-automatic, or manually controlled operation

Constructed of carbon steel, stainless steel or Monel metal, Sturtevant Rotary Blenders are engineered to fit each customer's needs – can be supplied with injector sprays and any desired control system.

For more on Sturtevant Blenders, request Bulletin No. 080B. (Bulletins also available on Mixers, Air Separators, Micronizers, Crushers and Grinders.) Write today. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

Check 4211 opposite last page.

NEW LITERATURE

Electric vibrators for use on bins, hoppers, and chutes are illustrated and described in 12-page catalog. Information on controllers and special vibrator cases is included. "Pulsating Magnet Electric Vibrator"—Syntron Company, 110 Lexington Ave., Homer City, Pa.

Check 4212 opposite last page.

Space filter is pictured in eight-page bulletin, incorporating filter-construction detail drawings. Bul 1505-5—Mine Safety Appliances Company, 201 N. Braddock Ave., Pittsburgh 8, Pa.

Check 4213 opposite last page.

Cryogenic refrigerators which utilize liquid nitrogen as refrigerant are pictured and explained in 6-page Bul F-1262—Linde Company, division of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.

Check 4214 opposite last page.

Proportioning feeder for controlled feeding of hypochlorite or other water-treatment chemicals into small water systems is presented in two-page Bul 1913.20A-1 — Proportioneers Division of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R.I.

Check 4215 opposite last page.

Cup-orifice plate, which converts manufacturer's standard unions into gasketless orifice unions, are outlined in Cup-orifice Cat — Catawissa Valve & Fittings Co., Catawissa, Pa.

Check 4216 opposite last page.

Dump trailers of all-steel or all-aluminum construction are treated in four-page Dump Trailer Brochure—Trailco Manufacturing and Sales Company, Hummels Wharf, Pa.

Check 4217 opposite last page.

Storage racks of many types are shown in 12-page bulletin. Photos depict application for various storage situations. Bul R-400—Chicago Tramrail Corporation, 1330 S. Kostner Ave., Chicago 23, Ill.

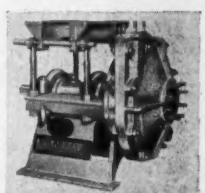
Check 4218 opposite last page.

Digital control computer used in nuclear field is discussed in 8-page bulletin. Applications covered include data logging, alarm scanning, on-line computation, sequencing, and automatic control. "Nuclear Reactor Monitoring" — The Thompson-Ramo-Wooldridge Products Company Div. of Thompson Ramo Wooldridge Inc., P. O. Box 90067 Airport Station, Los Angeles 45, Calif.

Check 4219 opposite last page.

PLACE A GALIGHER ACID-PROOF SUMP PUMP ON TRIAL IN YOUR PLANT

And you'll judge it not guilty of the common causes of pump failure . Galigher Sump Pumps have no troublesome submerged bearings, mechanical seals or packing. And, because of its double thrustless design, there is no airlock even with frothy materials. Galigher Sump Pumps transfer solutions over a wide feed volume range without speed adjustment. Even highly abrasive 60% solid slurries will not damage the pump. Made in four production models and custom designs, Galigher pumps are available in hard iron, stainless steel, natural or synthetic rubber or plastic coverings ... direct or V-drive. Write us today, and learn how you can try a Galigher Sump Pump in your plant.



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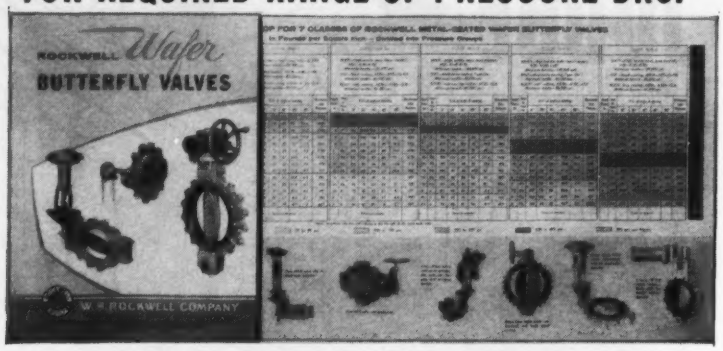
SP-511

Check 4220 opposite last page.

NOW! SELECTION MADE EASY

OF THE "WAFER" BUTTERFLY VALVE YOU NEED FOR REQUIRED RANGE OF PRESSURE DROP



This new Bulletin No. 583 gives all the facts to help you select just the size and construction of valve for your air, gas or liquid lines. Illustrations—charts—tables are arranged in a practical, easy-to-use manner. Write for your copy.

ROCKWELL SINCE 1888 BUILT

W. S. ROCKWELL COMPANY

Valves—Butterfly · Slide · Diaphragm · Special

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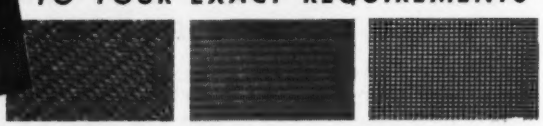
Check 4221 opposite last page.

Wire Cloth-Filter Cloth

TO YOUR EXACT REQUIREMENTS

in Rolls or Cut Pieces



WIRE CLOTH all standard grades, for Industrial and Paper Mill use, all weaves, widths to 244", corrosion-resistant alloys.
FILTER CLOTH all standard weaves and densities, woven in corrosion resistant alloys, extra wide.
NEVA-CLOG perforated metal sheet filter medium—strong, rigid, smooth, non-clogging.
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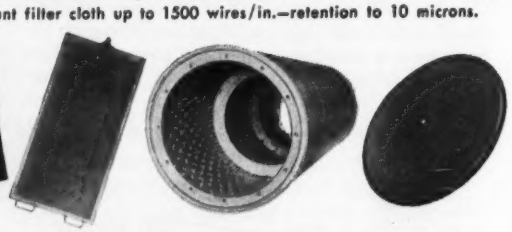


"RIM-LOK" leaves for stationary leaf batch pressure filters, vertical or horizontal shell.
Filter leaves (bare or covered) for all other standard pressure filters.
Custom-made leaves and elements to your special design.
Screens—Strainers—Cylinders—Vibrating Screens
Discs—Process Equipment or components—Trays
Inquiries invited. Write for Catalog

MULTI-METAL WIRE CLOTH CO., INC.
1356 GARRISON AVENUE · NEW YORK 59, N. Y.

Check 4222 opposite last page.

NEW LITERATURE

Overhead materials handling equipment is detailed in revised 12-page booklet which includes studies of track design, peening, and stresses. Bul 2008-0 — The Cleveland Tramrail Division of The Cleveland Crane & Engineering Co., 1036 East 289th St., Wickliffe, Ohio.

Check 4223 opposite last page.

Magnetic separators and their use in recovering heavy media is subject of two-page bulletin. Unit described is a wet magnetic drum-type separator designed for low-cost recovery. Operating characteristics, features, and specifications are cited. Bul 2012 — Stearns Magnetic Products, 635 South 28th Street, Milwaukee 46, Wis.

Check 4224 opposite last page.

Spray nozzles are delineated in a catalog which includes information on wide range of nozzle types and sizes. "Spraco Nozzles" — 105 Cambridge St., Burlington, Massachusetts.

Check 4225 opposite last page.

Pipe-wrap tapes are subject of six-page Permacel booklet — Permacel, New Brunswick, N. J.

Check 4226 opposite last page.

Conveyors—48-page catalog, profusely illustrated, covers manufacturer's complete line of wheel, roller, slat-and-chain, belt, and floor-to-floor conveyors. Full specifications for the various types are included in tables and drawings. Cat A-101—Sage Equipment Company, Inc., 30 Essex St., Buffalo 13, N. Y.

Check 4227 opposite last page.

Chemical feed system for a sequestant to process water is explained in two-page Data Sheet J-58-2 — Milton Roy Company, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

Check 4228 opposite last page.

Electric motors of geared and non-geared types, controllers, mixers, rectifiers, and relays are listed in Stock List 107-59 — B & B Electric Motor Company, 206 Lafayette St., New York, N.Y.

Check 4229 opposite last page.

Pallet tests which aid a user in determining if a given pallet will do a specific job have been released. The tests cover warehouse conditions and shipping conditions. Copies of Approved Tests for Evaluating Pallets may be obtained from National Wooden Pallet Manufacturers Association, Barr Bldg., Washington 6, D. C.

Check 4230 opposite last page.

Bag slitter which automatically opens and dumps multi-walls is fully described in four-page bulletin—Wiretyer Corporation, 65 Leliarts Lane, East Paterson, N. J.

Check 4231 opposite last page.

Centrifugal pump of all-PVC construction is reviewed in PVC Centrifugal Pump Literature — Vanton Pump & Equipment Corp., Division of Cooper Alloy Corp., Hillside, N.J.

Check 4232 opposite last page.

Continuous blender for mixing liquids with solids or solids with solids is illustrated with photos and diagrams in four-page Bul 100—O'Brien Industrial Equipment Co., 1596 Hudson Ave., San Francisco 24, Calif.

Check 4233 opposite last page.

Silicon-carbide-bonded graphite is delineated in four-page Silicon Carbide Bul — New Products Branch, Research & Development Division, The Carborundum Company, Niagara Falls, N. Y.

Check 4234 opposite last page.

Filter sheets, available in 10 uniform grades for all filters up to 25" square, are topic of a catalog which includes charts and technical data. Cat 58 — Ertel Engineering Corporation, Kingston 3, New York.

Check 4235 opposite last page.

Hydraulic dumper catalog points out how these units cut costs in handling and emptying bulk containers. Includes folder of users, with examples of how unit is used for feeding, mixing, and batching operations. Cat D-C-59—Uhrden, Inc., Dennison, Ohio.

Check 4236 opposite last page.

"Thought your lighter would make a good vapor detector, eh?"

Ultrasonic grinding, machining is subject of four-page bulletin, outlining service which permits designers and engineers to use materials previously difficult to grind and machine. Bul UG559—Precision Glass Products Co., 6138-40 Beechwood St., Philadelphia 38, Pennsylvania.

Check 4237 opposite last page.

Two epoxides, dicyclopentadiene dioxide and limonene dioxide, are considered in detail in Tech Buls 95 and 96—Chemicals & Plastics Division, Food Machinery and Chemical Corporation, 161 E. 42nd St., New York 17, N.Y.

Check 4238 opposite last page.

Turbine flowmeters are summarized with text, photos, and drawings in four-page Bul 1384 — Cox Instruments Division, George L. Nankervis Company, 15300 Fullerton Ave., Detroit 27, Mich.

Check 4239 opposite last page.

Stainless-steel pipe is covered in Bul TB-410 — Tubular Products Division, The Babcock & Wilcox Company, Beaver Falls, Pa.

Check 4240 opposite last page.

Indicators for continuous measurement of liquid specific gravity are presented with complete construction details and drawings in Bul 18S — Dept. MO, Instrument Division of Schutte and Koerting Co., Cornwells Heights, Bucks Co., Pa.

Check 4241 opposite last page.

Use of catalysts in preparing neopentyl-glycol polyesters is summarized in 10-page Booklet TDR N-106 — Eastman Chemical Products, Inc., Subs of Eastman Kodak Company, Kingsport, Tenn.

Check 4242 opposite last page.

Pipe-protection tape of PVC in roll form is subject of "Scotchrap" Literature — Minnesota Mining and Manufacturing Company, 900 Bush Ave., St. Paul 6, Minn.

Check 4243 opposite last page.

Side-transfer warehouse device which eliminates 90° turn of fork trucks and permits greater utilization of aisle space is described in four-page brochure. "STOW" — Equipment Mfg., Inc., 21550 Hoover Rd., Detroit, Mich.

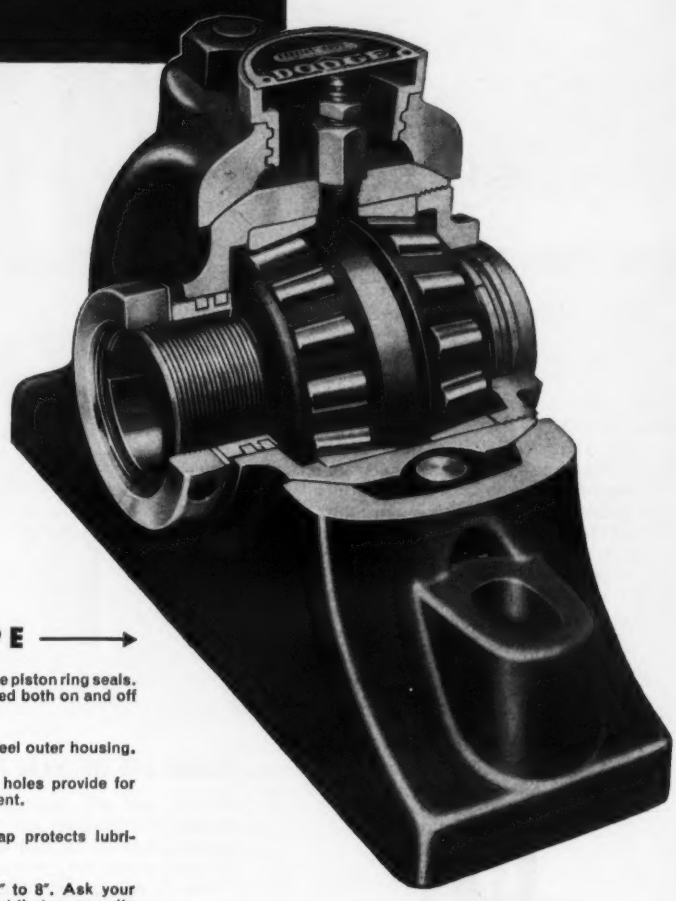
Check 4244 opposite last page.

Open flooring—its advantages and uses—is featured in 24-page Bul 2527-R — Grating Department, Blaw-Knox Company, PO Box 1198, Pittsburgh 30, Pa.

Check 4245 opposite last page.

DODGE PILLOW BLOCKS WITH TIMKEN BEARINGS

America's super-quality line—with a 35 year record of keeping performance *up* and costs *down!* Five types—to fit practically any service condition. All assembled, adjusted, lubricated and *sealed* at the factory for precision performance—long life—dependability.



SPECIAL DUTY TYPE ⟶

- Designed for extreme precision and high load capacities.
- Fully self-aligning.
- Special Duplex Timken Roller Bearing with tapered bore.
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- Rugged semisteel outer housing.
- Elongated bolt holes provide for lateral adjustment.
- Special dust cap protects lubrication fitting.
- Shaft sizes 1¾" to 8". Ask your local Dodge Distributor—or write us for Bulletin A670 giving complete technical data on America's most complete line of mounted bearings.

DODGE MANUFACTURING CORPORATION, 6200 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

DODGE
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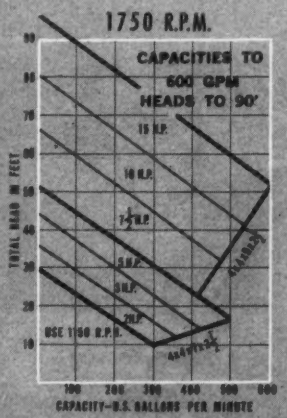
Check 4246 opposite last page.

YEOMANS NEW SUBMERSIBLE

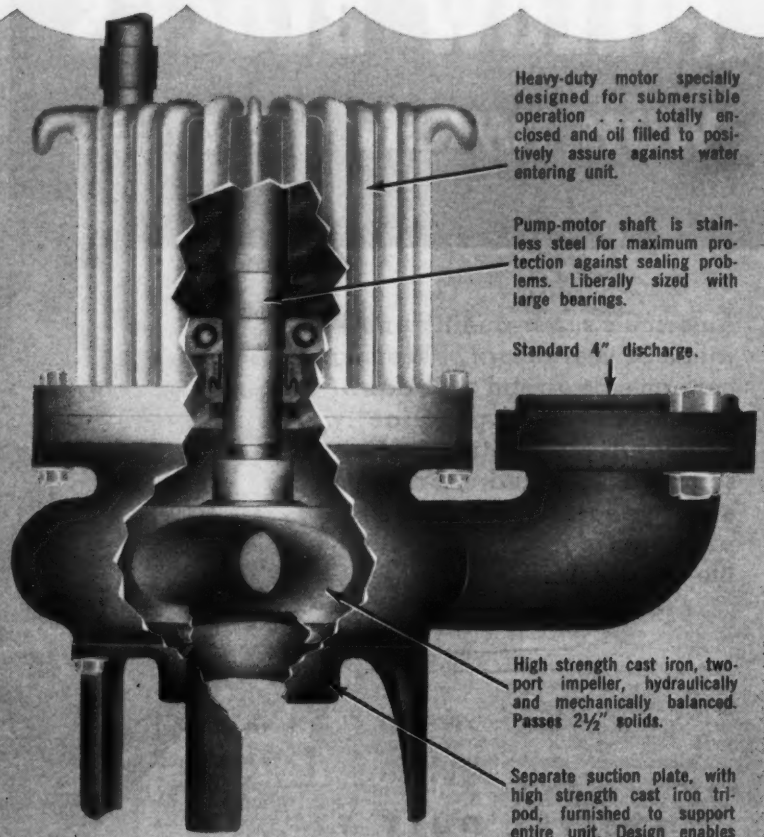
Nonclog sewage and drainage pump— Series 9000



APPLICATIONS — Commercial and industrial buildings, processing plants, utilities, sewage plants, water treatment facilities, recreation parks and pools.

AUTOMATIC CONTROLS — Heavy-duty float switch with float and rig, or electrode control. In duplex installations, Yeomans "Interchanger" equalizes wear between the two pumps by alternating operation. In addition, the "Interchanger" starts the pump not in use when peak conditions call for extra capacity.

Complete details available from your Yeomans representative, or write the factory for Leaflet 9001.



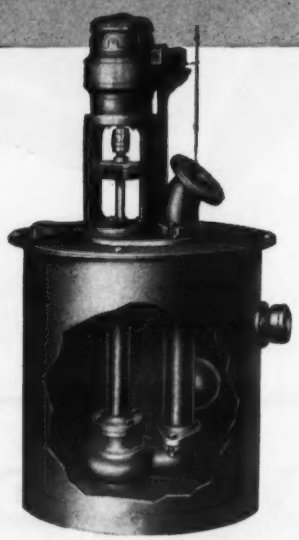
Heavy-duty motor specially designed for submersible operation . . . totally enclosed and oil filled to positively assure against water entering unit.

Pump-motor shaft is stainless steel for maximum protection against sealing problems. Liberally sized with large bearings.

Standard 4" discharge.

High strength cast iron, two-port impeller, hydraulically and mechanically balanced. Passes 2½" solids.

Separate suction plate, with high strength cast iron tripod, furnished to support entire unit. Design enables easy, quick access to impeller.



SEWAGE AND DRAINAGE PUMPING CALLS FOR A SKILL OF ITS OWN

Vertical wet pit pump jobs are as individual as people. Each sewage and drainage job demands a certain type of unit, materials, packing, lubricants, bearings, and speed. If these variables are not properly combined, pump performance and life suffer.

Here's where Yeomans' 61 years of service to the building, industrial, and processing fields is invaluable. Here's where the "calculated feel" and know-how of Yeomans engineering pays off in extra long pump life and low maintenance.

On your next sewage and drainage jobs, ask for recommendations from the industry's leader. Call in your Yeomans representative and **be sure.** He's a specialist with a complete line of waste handling pumps. Look in Sweet's Catalogs or the yellow pages of the phone book.

YEOMANS

2003-5 North Ruby Street, Melrose Park, Illinois

P-5922

Check 4247 opposite last page.

NEW LITERATURE

Temperature controllers and allied equipment for industrial heating and refrigeration are set forth with charts, specifications, and photos in eight-page Cat CC—The Partlow Corporation, 520 Campion Rd., New Hartford, N.Y.

Check 4248 opposite last page.

Electric process heater applications are outlined in 64-page Cat 60—Edwin L. Wiegand Company, 7500 Thomas Blvd., Pittsburgh 8, Pennsylvania.

Check 4249 opposite last page.

Lubricated plug valves are revised in detail in Cat 39-1 — Homestead Valve Manufacturing Company, Box 140, Coraopolis, Pa.

Check 4250 opposite last page.

Mobile crane designed for handling collapsible rubber container is shown in action in six-page bulletin. Vehicle is made in eight standard sizes ranging from 3 to 15 tons capacity; larger sizes are available. Bul 91A—Silent Hoist & Crane Co., Brooklyn 20, N.Y.

Check 4251 opposite last page.

Fluid drives and gearmotors are presented with data on functions, selection, dimensions, ratings, and mountings in 48-page Book 2747—Dept. PR, Link-Belt Company, Prudential Plaza, Chicago 1, Ill.

Check 4252 opposite last page.

Major plastic families are summarized in four-page Facts About Plastics booklet—Cadillac Plastic & Chemical Co., 15111 Second Ave., Detroit 3, Mich.

Check 4253 opposite last page.

Metal-mesh belts are expanded upon in Conveyor-belt Reference Manual — Dept. F, The Cambridge Wire Cloth Co., Cambridge 9, Maryland.

Check 4254 opposite last page.

Seventeen chemicals common to boron chemistry and related fields are cataloged in 4-page Product Information Digest—Marketing Division, Callery Chemical Company, 9600 Perry Highway, Pittsburgh 37, Pa.

Check 4255 opposite last page.

Radioactive-fallout report, presented at hearings on fallout conducted by Joint Committee on Atomic Energy of the U.S. Congress during May 5-8, is summarized in 110-page Bul TID-5550. This document may be purchased from Office of Technical Services, Department of Commerce, Washington 25, D. C., for $1.25 per copy.

Lift truck's torque converter drive which permits fast, smooth change of direction and safe, positive inching and brake control is analyzed in four-page bulletin. Components of drive are clearly shown with multi-color sectional drawing. Bul 465A—Engine-Material Handling Division, Allis-Chalmers Mfg. Co., Milwaukee 1, Wisc.

Check 4256 opposite last page.

Fluid control products are incorporated in a catalog which includes information concerning all types of valves. "Fluid Control Products" — Hoke Incorporated, 45 Piermont Rd., Cresskill, N.J.

Check 4257 opposite last page.

GLYD rings fabricated of Teflon and their application to hydraulic and pneumatic systems are considered in detail in six-page GLYD Bul — W. S. Shamban & Co., Box 1037, Culver City, Calif.

Check 4258 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Adjustable-pressure conveyor which can accumulate cartons with a minimum of line pressure, and space them out regularly is covered in eight-page booklet. Specifications, cutaway photographs, and application photographs aid in the explanation. A-P-C Booklet—The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.

Check 4259 opposite last page.

Portable lubricator is among air-powered and electric-powered lubrication equipment for industrial use summarized in Alemite Lubrication Cat—Alemite Division, Stewart-Warner Corporation, 1850 Diversey Parkway, Chicago 14, Ill.

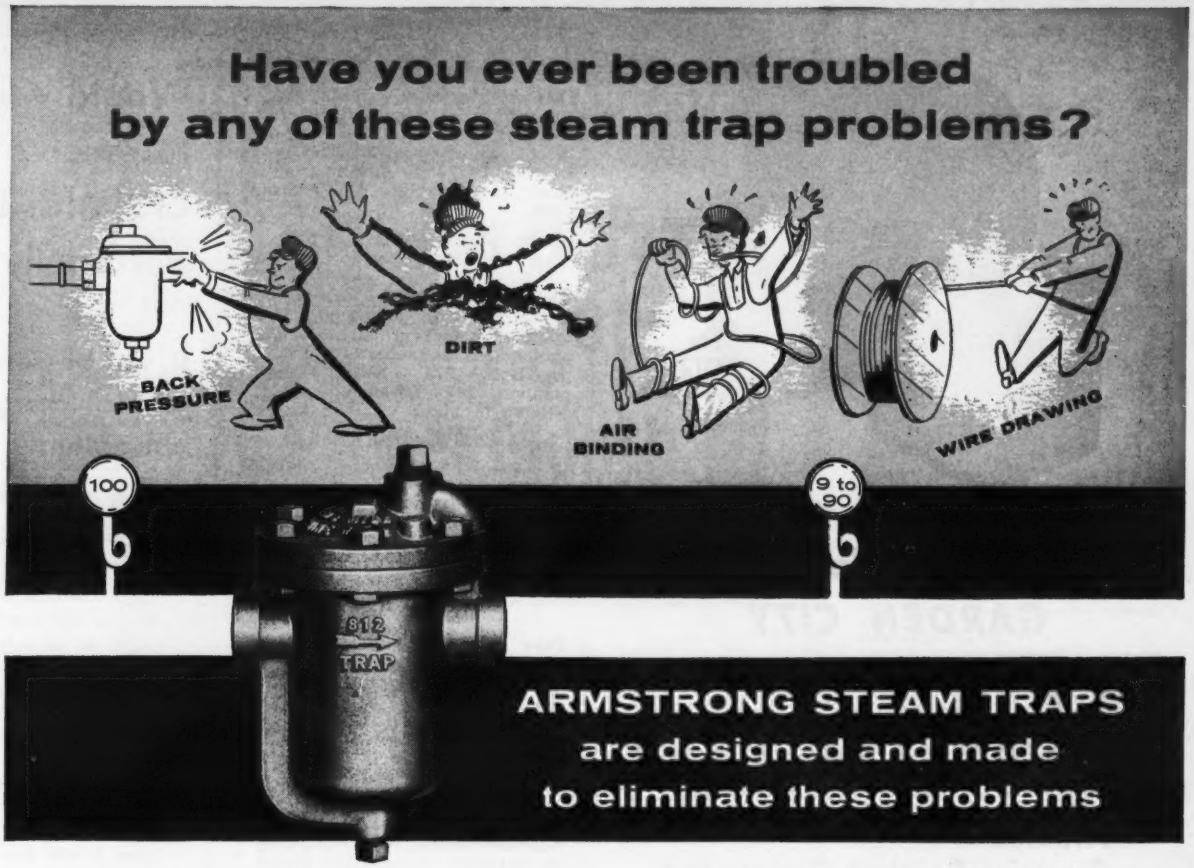
Check 4260 opposite last page.

Steam specialties, including strainers, traps, and valves, are exhibited in 12-page Bul 203—Dept. PD, Illinois Engineering Division, American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.

Check 4261 opposite last page.

How to evaluate an analytical method with radioisotopes is discussed in four-page technical bulletin No. 5 — Nuclear-Chicago Corporation, 229 W. Erie St., Chicago 10, Ill.

Check 4262 opposite last page.



BACK PRESSURE . . . Armstrong Traps operate on any back pressure—or vacuum, for that matter. As long as there is a pressure differential across the trap, it will close on steam and open for condensate. Even the high back pressure caused by blow through of one or more traps in the system will not disturb Armstrong Traps. Other than a reduction in capacity, Armstrong Traps are unaffected by back pressure.

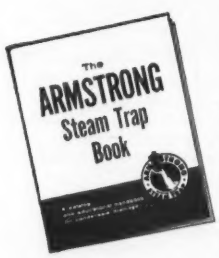
DIRT . . . Armstrong Traps are not affected by ordinary dirt. When the trap opens condensate swirls down under the edge of the bucket and up through the discharge orifice. Dirt is kept in suspension and discharged along with the condensate. For very bad dirt conditions, Armstrong offers traps with integral strainers. These cost less than a trap plus a separate strainer.

AIR BINDING . . . Armstrong Traps cannot air bind. Air in the system passes through a vent in the top of the bucket. It collects in the top of the trap and is discharged with the condensate. There is no chance for it to stop the trap. For low pressure on-and-off units where large amounts of air accumulate while the steam is off, Armstrong offers open float and thermostatic air vent traps in a complete range of sizes.

WIRE DRAWING . . . Armstrong Traps are designed and made to resist wire drawing. The valve and seat are tough stainless steel. The valve opens and closes tightly with a fast action and is always water sealed. There is virtually no chance for grit or sediment to lodge in the valve, virtually no chance to create conditions that lead to wire drawing.

There's no need to accept any of these problems as "inevitable." Your local Armstrong Representative can show you how to end them all. Call him today or write direct.

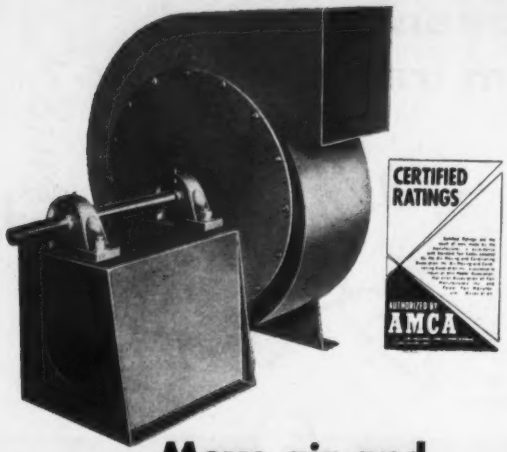
860 Series for low pressure heating service.
800 Series, side inlet, side outlet.
No. 801, side inlet, bottom outlet.
880 Series, integral strainer.
200 Series, bottom inlet, top outlet.
Forged Steel Series for high pressures, high temperatures.



The 48 page Armstrong Steam Trap Book tells how to correctly size, install and maintain steam traps for any pressure, any temperature, any load plus full catalog data on Armstrong Steam Traps. Ask for Catalog K.

ARMSTRONG MACHINE WORKS
8803 Maple Street Three Rivers, Michigan

Check 4263 opposite last page.



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Corrosion Resistant Construction

Tell us WHAT corrosives in gases, fumes or vapors . . . or dusts, other materials . . . you must combat, and we can give you a construction in a special metal, or a metal with a special coating, properly designed for your application. In order to utilize the most effective corrosive-resistant material for your needs, our engineers must have detailed information about your application.
Garden City Fan Company is a member of Air Moving and Conditioning Association, Inc.

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Dept. P, Niles, Michigan

Send me complete information on your RF Industrial Fans. The fan I am interested in must be resistant to these corrosives:

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Check 4264 opposite last page.

NEW LITERATURE

Diatomaceous earth technical data and properties are presented in four-page bulletin, which also describes uses of diatomite. Service Bul E-77459—Aquafil Company, 321 State St., Los Altos, Calif.

Check 4265 opposite last page.

Viscosity controls for automatic solvent addition to correct for evaporation losses are detailed with photographs and charts in four-page Bul V-1224 — Norcross Corporation, 247 Newtonville Ave., Newton 58, Mass.

Check 4266 opposite last page.

Sterilizing filters are pictured and data given in Bul 100 — Filtros Incorporated, 603 W. Commercial St., East Rochester, N. Y.

Check 4267 opposite last page.

Flow tubes of the plastic insert-type for primary flow metering are described and illustrated in four-page Bul 115.20-1 — Builders-Providence Division, B-I-F Industries, Inc., 345 Harris Ave., Providence, R. I.

Check 4268 opposite last page.

Adjustable-speed drive equipment for extruders is topic for 8-page bulletin, including discussion of various types of applications. Bul GEA-6909—General Electric Company, Schenectady 5, N. Y.

Check 4269 opposite last page.

Pointer gages and vertical-scale indicator are presented in series of specification sheets. Pointer Gages Buls 211, 212 and 213 and Indicator Bul 214—The Hays Corporation, Michigan City, Ind.

Check 4270 opposite last page.

Hydraulic weighing systems for use in load capacities up to 5000 lb are described in eight-page brochure. Also covered is instrumentation that can be used with cells. Bul 591 — The A. H. Emery Company, Pine and Grove Sts., New Canaan, Conn.

Check 4271 opposite last page.

Centrifugal pumps of both open- and closed-impeller types are reviewed in Bul 107 — Frederick Iron and Steel Inc., Frederick, Maryland.

Check 4272 opposite last page.

Calibration of sieves with higher accuracy by means of two standard samples of glass spheres made available by National Bureau of Standards is explained in STR-2368—National Bureau of Standards, U. S. Department of Commerce, Washington 25, D.C.

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NEW LITERATURE

Plastic gate valve, which is available in PVC, Kralastic, or Penton construction, is presented in Plastic Gate Valve Literature — Vanton Pump & Equipment Corp., Division of Cooper Alloy Corp., Hillside, N.J.

Check 4273 opposite last page.

Polymer products and specific properties are charted in eight-page Polymer Products Directory —Polyco-Monomer Department, Borden Chemical Company, 350 Madison Ave., New York 17, N.Y.

Check 4274 opposite last page.

Induction voltage regulators are presented in 60-page booklet incorporating drawings and rating tables. Voltage Regulator Booklet —Voltage Regulator Product Section, General Electric Company, Pittsfield, Mass.

Check 4275 opposite last page.

Deionization processes and equipment are illustrated and described in four-page bulletin. Photographs show actual plant installations. Included are mixed-bed and two-bed deionizers, as well as filters, aerators, clarifiers, and softeners. "Deionization Processes and Equipment" — Illinois Water Treatment Company, 840 Cedar St., Rockford, Ill.

Check 4276 opposite last page.

Industrial glass receives full treatment including applications, physical properties, and other characteristics in eight-page Bul B-91 — Technical Products Div., Corning Glass Works, Corning, N. Y.

Check 4277 opposite last page.

Wire cloth and wire cloth parts, available in wide variety of meshes and corrosion-resistant metals, are treated in Wire Cloth Literature — Newark Wire Cloth Company, 351 Verona Ave., Newark 4, N.J.

Check 4278 opposite last page.

Fork-lift truck, electrically powered, and with inching system for exact load spotting, is subject of eight-page circular. Features of load stability, high-pressure hydraulic lift system, convenient servicing, and compact control center are revealed. Table gives full specifications. Circular 32B—Lewis-Shepard Products, Inc., 125 Walnut St., Watertown 72, Mass.

Check 4279 opposite last page.

Radioactive chemicals, radiation sources, radioactivity devices, and services are presented in NENC Cat — New England Nuclear Corp., 575 Albany St., Boston 18, Mass.

Check 4280 opposite last page.

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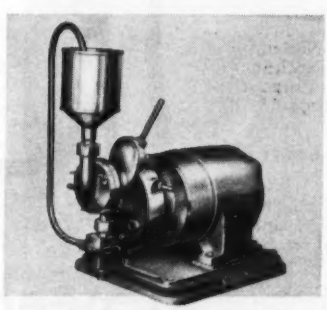

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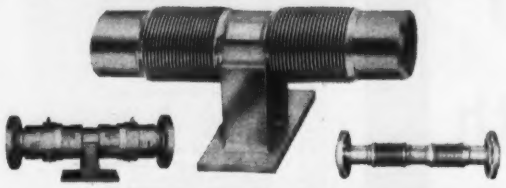

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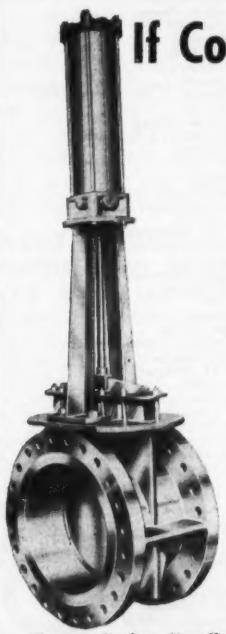

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Check 4283 opposite last page.

NEW LITERATURE

Steam trapping is covered in Steam Trapping Bul — Yarnall-Waring Co., 125 Mermaid Ave., Philadelphia, Pa.

Check 4284 opposite last page.

Centrifugal process pumps of single-stage type are delineated in illustrated Bul 135 — Pacific Pumps, Inc., 5715 Bickett St., Huntington Park, Calif.

Check 4285 opposite last page.

Crawler tractor engineering and operating features are highlighted in 16-page brochure which makes ample use of pictures, graphs, and charts. Bul MS-1251 — Construction Machinery Div., Allis-Chalmers Manufacturing Company, Milwaukee 1, Wis.

Check 4286 opposite last page.

Platinum-base hydrogenation catalyst applications and characteristics are subject of G-43 Bul—Girdler Catalysts, Chemetron Corporation, PO Box 337, Louisville 1, Ky.

Check 4287 opposite last page.

Heavy-duty compressors are illustrated with photos and diagrams, accompanied by explanatory text, in 16-page Bul 651-C—Frick Company, Waynesboro, Pa.

Check 4288 opposite last page.

Polyethylene drums in capacities of 20, 32, and 55 gal, as well as polyethylene tubs and buckets, are presented in six-page folder. "Drums, Tubs and Buckets" — Redmanson Corporation, 630 Loucks Mill Rd., York, Pa.

Check 4289 opposite last page.

Evaluation of radioactivity, as aid in solving production, processing, or quality-control problems, may be conducted with aid of Nuclear Applications Worksheet—Nuclear Science and Engineering Corporation, Box 10901, Pittsburgh 36, Pennsylvania.

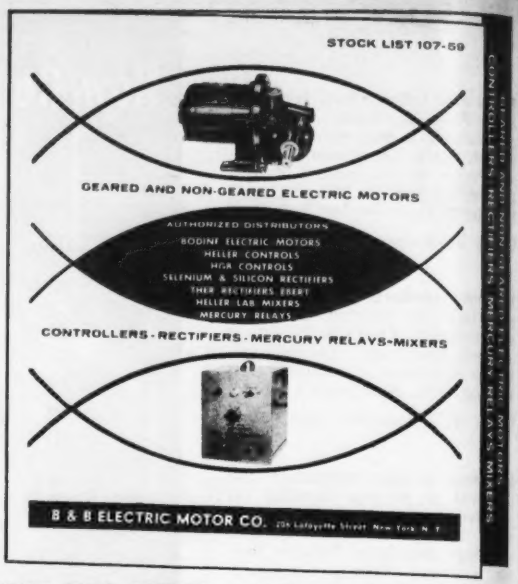
Check 4290 opposite last page.

Processing equipment including hammer mills, attrition mills, and crushers for various industries are illustrated and described in four-page bulletin. Bul 59 — The Bauer Bros. Co., 1728 Sheridan Ave., Springfield, Ohio.

Check 4291 opposite last page.

Tube-type filters, with any desired degree of micro-clarity for all types of industrial fluids, are among filters covered by Filter Cat — Dept. CP, Commercial Filters Corporation, Melrose 76, Massachusetts.

Check 4292 opposite last page.



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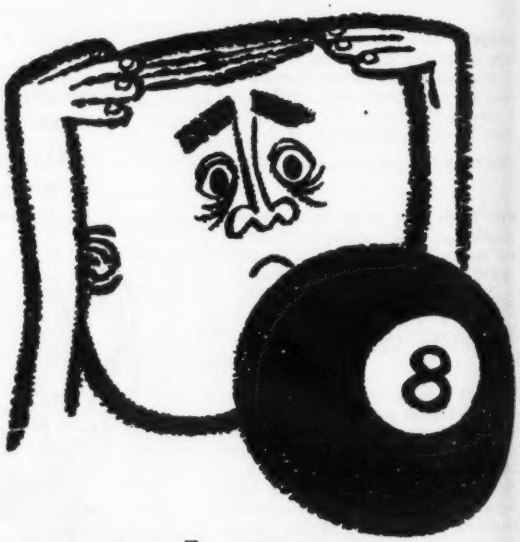

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NEW LITERATURE

Three-way valves for feedwater-heater bypass lines are previewed in four-page bulletin, including diagrams and application schematics. Bul 8F—Schutte and Koerting Company, Cornwells Heights, Bucks Co., Pa.

Check 4294 opposite last page.

Yttrium metal — its applications and characteristics — are treated in Yttrium Data Sheet — Research Chemicals Division, Nuclear Corporation of America, PO Box 431, Burbank, Calif.

Check 4295 opposite last page.

Industrial melting tanks are pictured in eight-page Bul TA-JP-1—Aeroil Products Company, Inc., 69 Wesley St., South Hackensack, New Jersey.

Check 4296 opposite last page.

Filling machine which fills 20 to 40 gallons per minute of liquid, semi-liquid, and semi-solid products—at a gallon a stroke—is introduced in bulletin. Bottom-up method prevents air-pocket formation and assures fill accuracy. Model G-59 Bul—The Filler Machine Company, 10 Penn Ave., Philadelphia 11, Pa.

Check 4297 opposite last page.

Spray-nozzle joints, for installations requiring angular positioning of nozzles, are covered in Bul 97 — Spraying Systems Company, 3216 Randolph St., Bellwood, Ill.

Check 4298 opposite last page.

Electric fork truck of 3000-lb capacity is detailed in four-page bulletin. Unit is specifically designed for low-head-room area. Model F-48T3 Bul — The Elwell-Parker Electric Company, 4205 St. Clair Ave., Cleveland 3, Ohio.

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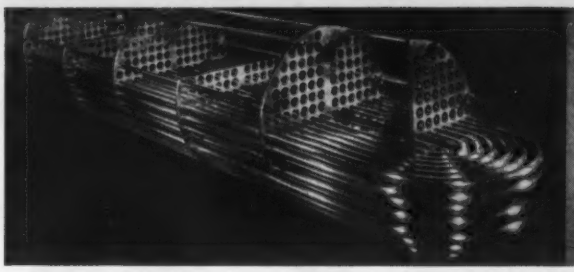

CONDENSER AND HEAT EXCHANGER CLINIC

Edited by David S. Hibbard, Metallurgical Engineer
The American Brass Company, Buffalo 5, New York

New tube mill equipment gives designer of heat-transfer units freer hand in meeting new trends

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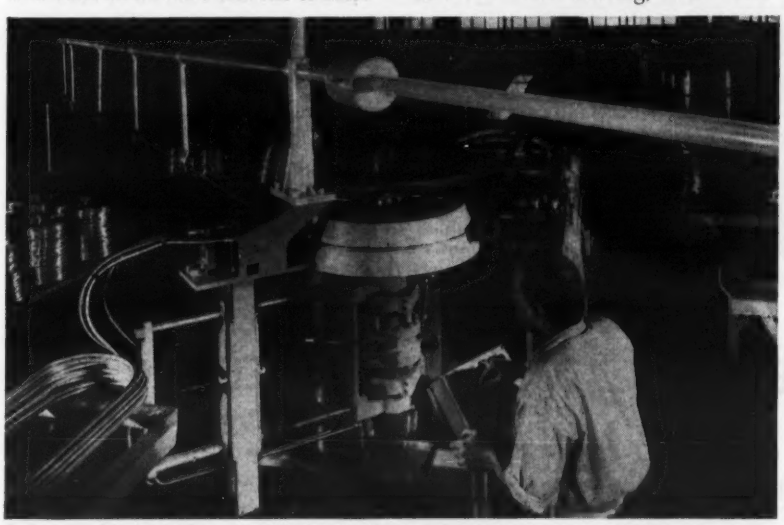
GENERAL VIEW of new American Brass Company equipment which can draw copper and copper alloy tubes in lengths up to 100 feet.



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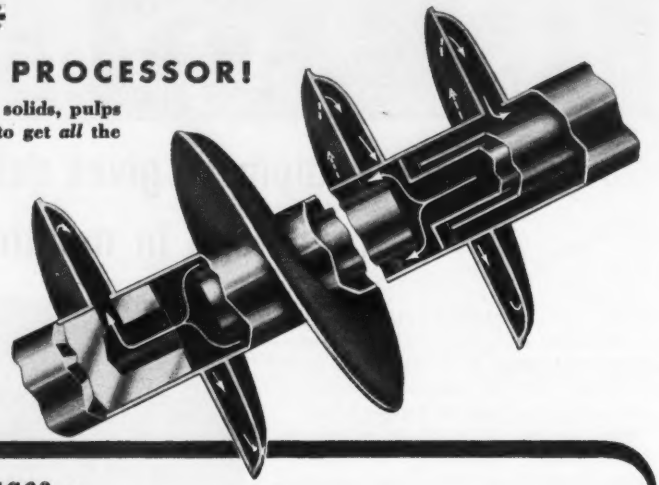
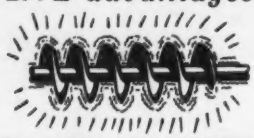


typical HOLO-FLITE *advantages...*

ITS APPLICATION FLEXIBILITY is almost unlimited. It cools, heats, or dries. It handles granular solids, pulps, pastes, slurries and fluids with equal ease. Its heat transfer agent can be water, refrigerant, hot oil, Dowtherm, steam or other liquids or vapors at any of a wide range of temperatures. It cools materials in ranges from 1800°F to 0°F. It heats and dries with hot oil to 600°F...with Dowtherm to 750°F...with steam to 150 lbs. per sq. in. pressure.



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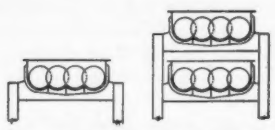

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Check 4301 opposite last page.

NEW LITERATURE

Industrial gases—how they are produced and their commercial applications—are surveyed in 32-page booklet. Cat ADC 892—Air Reduction Sales Company, Div. of Air Reduction Company, Inc., 150 East 42nd St., New York 17, New York.

Check 4302 opposite last page.

Roller bearings, in nine lines, are outlined in Cat PI-559—Rollway Bearing Co., Syracuse 4, N. Y.

Check 4303 opposite last page.

Canned-pump uses and advantages in nuclear field are indicated along with details of specific applications and list of firms active in field. Tech Bul 4—Chempump Corporation, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

Check 4304 opposite last page.

Pneumatic conveyors take the spotlight in eight-page bulletin. Component parts of complete systems are illustrated. Drawings and photos reveal application in many handling problems. Bul P-259—The Young Machinery Co., Inc., Muncy, Pa.

Check 4305 opposite last page.

Wire cloth, in variety of grades and weaves, and components fabricated of cloth, such as filters, are dealt with in Wire Cloth Cat — Multi-Metal Wire Cloth Co., Inc., 1356 Garrison Ave., New York 59, N.Y.

Check 4306 opposite last page.

Caprolactam monomer is described in technical bulletin. Chemical reaction routes to commercial possibilities are explained and schematically diagramed. Tech Bul I-14R (revised)—Allied Chemical Corporation, National Aniline Division, 40 Rector St., New York 6, New York.

Check 4307 opposite last page.

Magnetic brakes are depicted in illustrated four-page Bul 5000 — The Electric Controller & Mfg. Co., Division of Square D Company, 4500 Lee Road, Cleveland 28, Ohio.

Check 4308 opposite last page.

Lubricated plug valves are presented in eight-page bulletin including description of coating properties, tables of recommended applications and photo-illustrations showing typical installations. Bul V-614—Meter and Valve Division, Rockwell Manufacturing Company, 400 N. Lexington Ave., Pittsburgh 8, Pa.

Check 4309 opposite last page.

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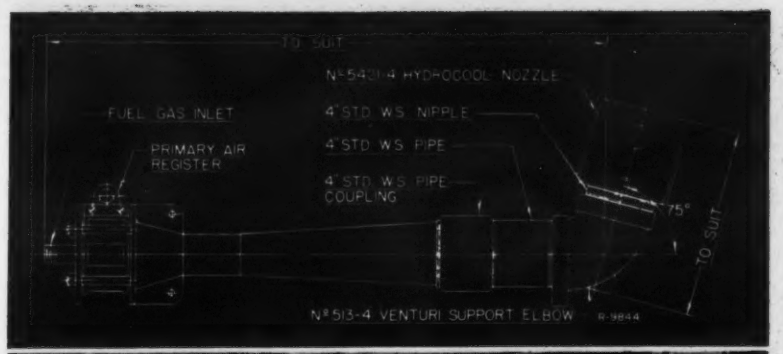

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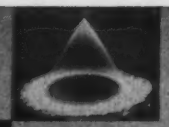

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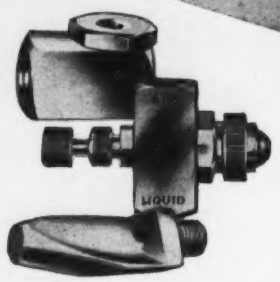

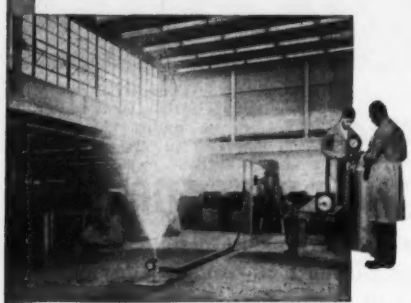

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As a part of its own plant operation, Spraying Systems Co. maintains its own research facilities, for the continuing study of new spray nozzle designs, materials and applications. The many advantages of research are an inherent quality of every Spraying Systems spray nozzle you buy.

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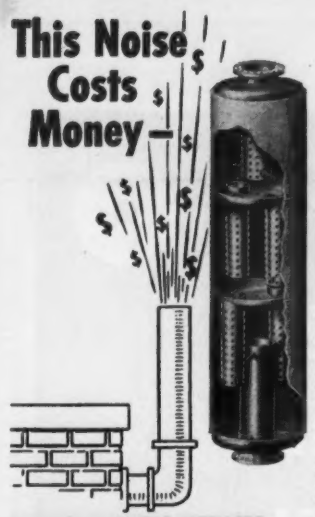

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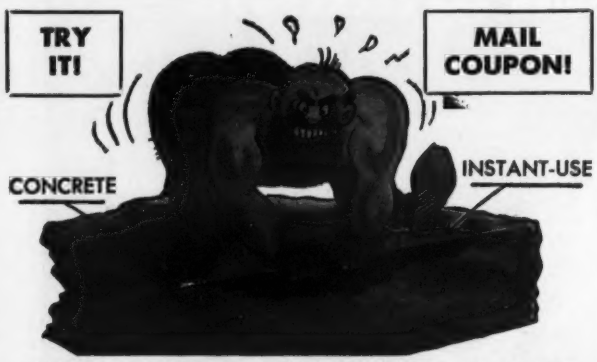

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NEW LITERATURE

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Epoxy surface covering is reviewed in 4-page Bul 510—Nukem Products Corp., Buffalo 20, N. Y.

Check 4315 opposite last page.

Ethylene-propylene copolymer rubber developed by Montecatini is reported on in technical information bulletin consisting of three sheets. C23 Tech Bul — Chemore Corporation, 2 Broadway, New York 4, N.Y.

Check 4316 opposite last page.

Metering pump featuring diaphragm not directly connected to plunger is detailed in Bul 71R1000 — Fischer & Porter Co., 141 Jacksonville Road, Hatboro, Pa.

Check 4317 opposite last page.

Adjustable dock plate with all-mechanical height setting is discussed in two-page illustrated "Holleen Dock Plate"—Tremplo Mfg., Inc., Osseo, Wis.

Check 4318 opposite last page.

Urethane foaming resin's self-extinguishing properties, plus techniques and equipment for mixing the resin, are covered in two bulletins. Buls R-112-6 and R-112-7 — Thiokol Chemical Corporation, 780 North Clinton Ave., Trenton 7, New Jersey.

Check 4319 opposite last page.

Spray dryers are reviewed in colorful eight-page bulletin, which is illustrated with photographs. Bul 442—Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.

Check 4320 opposite last page.

Steel-strapped tightener is introduced in four-page well-illustrated folder. Unit is manually operated, has unlimited takeup. Form SSS-261—Stanley Steel Strapping, Division of The Stanley Works, 1300 Corbin Ave., New Britain, Conn.

Check 4321 opposite last page.

Automatic scale for consecutive or cumulative process weighing by batch or continuous operation is specified in six-page Bul 3649A—Richardson Scale Company, Clifton, N. J.

Check 4322 opposite last page.

X-ray and gamma-ray testing and inspection equipment, utilized in maintaining quality control, is subject of eight-page bulletin. Bul DH-115 may be obtained by writing on company letterhead to R-P&C Valve Division, American Chain & Cable Co., Inc., 929 Connecticut Ave., Bridgeport 2, Conn.

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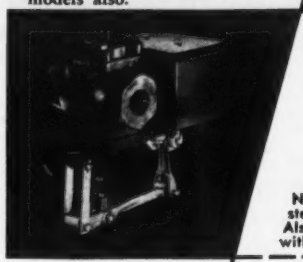
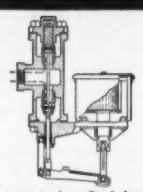
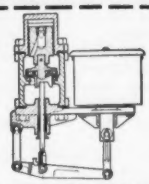


Normally closed service, stainless steel valve and seat. Sizes ⅜"-3". Also for normally open service, and with Jenkins Disc.



3-way valve. Stainless steel valves and seats. Sizes ½"-1½".



Dashpot construction, cushions closing to avoid water hammer. Jenkins Disc. Sizes ¾"-2".

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☐ 3748	☐ 3802	☐ 3856	☐ 3910	☐ 3964	☐ 4018
☐ 3749*	☐ 3803*	☐ 3857	☐ 3911	☐ 3965*	☐ 4019
☐ 3750	☐ 3804	☐ 3858	☐ 3912	☐ 3966	☐ 4020

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

Key No.	Description

☐ 4021	☐ 4072	☐ 4123	☐ 4174	☐ 4225	☐ 4276
☐ 4022	☐ 4073	☐ 4124	☐ 4175	☐ 4226	☐ 4277
☐ 4023	☐ 4074	☐ 4125	☐ 4176	☐ 4227	☐ 4278
☐ 4024	☐ 4075	☐ 4126	☐ 4177	☐ 4228	☐ 4279
☐ 4025*	☐ 4076	☐ 4127	☐ 4178	☐ 4229	☐ 4280*
☐ 4026	☐ 4077	☐ 4128	☐ 4179	☐ 4230	☐ 4281
☐ 4027	☐ 4078	☐ 4129	☐ 4180*	☐ 4231	☐ 4282
☐ 4028	☐ 4079	☐ 4130	☐ 4181	☐ 4232	☐ 4283
☐ 4029	☐ 4080	☐ 4131	☐ 4182	☐ 4233	☐ 4284
☐ 4030	☐ 4081	☐ 4132	☐ 4183	☐ 4234	☐ 4285
☐ 4031	☐ 4082	☐ 4133	☐ 4184	☐ 4235	☐ 4286
☐ 4032	☐ 4083	☐ 4134*	☐ 4185	☐ 4236	☐ 4287
☐ 4033	☐ 4084	☐ 4135	☐ 4186	☐ 4237	☐ 4288
☐ 4034	☐ 4085	☐ 4136	☐ 4187	☐ 4238	☐ 4289
☐ 4035	☐ 4086	☐ 4137	☐ 4188	☐ 4239	☐ 4290
☐ 4036	☐ 4087	☐ 4138	☐ 4189	☐ 4240	☐ 4291
☐ 4037	☐ 4088	☐ 4139*	☐ 4190	☐ 4241	☐ 4292
☐ 4038	☐ 4089	☐ 4140	☐ 4191	☐ 4242	☐ 4293
☐ 4039	☐ 4090	☐ 4141	☐ 4192	☐ 4243	☐ 4294
☐ 4040	☐ 4091	☐ 4142	☐ 4193	☐ 4244	☐ 4295
☐ 4041	☐ 4092	☐ 4143	☐ 4194	☐ 4245	☐ 4296
☐ 4042	☐ 4093	☐ 4144	☐ 4195	☐ 4246	☐ 4297
☐ 4043	☐ 4094	☐ 4145	☐ 4196	☐ 4247	☐ 4298
☐ 4044	☐ 4095*	☐ 4146	☐ 4197	☐ 4248	☐ 4299
☐ 4045	☐ 4096	☐ 4147	☐ 4198	☐ 4249	☐ 4300
☐ 4046	☐ 4097	☐ 4148	☐ 4199	☐ 4250	☐ 4301
☐ 4047	☐ 4098	☐ 4149*	☐ 4200	☐ 4251	☐ 4302
☐ 4048	☐ 4099	☐ 4150	☐ 4201	☐ 4252	☐ 4303
☐ 4049	☐ 4100	☐ 4151	☐ 4202*	☐ 4253	☐ 4304
☐ 4050	☐ 4101	☐ 4152	☐ 4203	☐ 4254	☐ 4305
☐ 4051	☐ 4102	☐ 4153	☐ 4204	☐ 4255	☐ 4306
☐ 4052	☐ 4103	☐ 4154	☐ 4205	☐ 4256	☐ 4307
☐ 4053	☐ 4104	☐ 4155	☐ 4206	☐ 4257	☐ 4308
☐ 4054	☐ 4105	☐ 4156	☐ 4207	☐ 4258	☐ 4309
☐ 4055	☐ 4106*	☐ 4157	☐ 4208	☐ 4259	☐ 4310
☐ 4056	☐ 4107	☐ 4158	☐ 4209	☐ 4260	☐ 4311
☐ 4057	☐ 4108	☐ 4159	☐ 4210	☐ 4261	☐ 4312
☐ 4058	☐ 4109	☐ 4160	☐ 4211	☐ 4262	☐ 4313
☐ 4059	☐ 4110	☐ 4161	☐ 4212	☐ 4263	☐ 4314
☐ 4060*	☐ 4111	☐ 4162*	☐ 4213	☐ 4264	☐ 4315
☐ 4061	☐ 4112	☐ 4163	☐ 4214	☐ 4265	☐ 4316
☐ 4062	☐ 4113	☐ 4164	☐ 4215	☐ 4266	☐ 4317
☐ 4063	☐ 4114	☐ 4165	☐ 4216	☐ 4267	☐ 4318
☐ 4064	☐ 4115	☐ 4166	☐ 4217	☐ 4268	☐ 4319
☐ 4065	☐ 4116	☐ 4167	☐ 4218	☐ 4269	☐ 4320
☐ 4066	☐ 4117	☐ 4168*	☐ 4219	☐ 4270*	☐ 4321
☐ 4067	☐ 4118	☐ 4169	☐ 4220	☐ 4271	☐ 4322
☐ 4068	☐ 4119	☐ 4170	☐ 4221	☐ 4272	☐ 4323
☐ 4069	☐ 4120	☐ 4171	☐ 4222	☐ 4273	☐ 4324
☐ 4070	☐ 4121	☐ 4172	☐ 4223	☐ 4274	☐ 4325
☐ 4071	☐ 4122	☐ 4173	☐ 4224	☐ 4275	☐ 4326
					☐ 4327
					☐ 4328

Be Sure To Give Your Address

*On all numbers having an asterisk (*) after them, please identify the exact product or piece of literature in one of the blank columns on this and front page. Write in the key number, as given on the slip, followed by the bulletin number (or title), or name of product in which you are interested.

(This request form expires December 5, 1959)

Use this space for writing in specific literature or product designation when you check a number with an asterisk (*) in accompanying list. Repeat the key number from that list, and follow it with specific bulletin number (or title), or product name, as it appears in article or advertisement. PLEASE TYPE OR PRINT.

Key No.	Description

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THAT'S INTERESTING

New process for HCl

Economical yield of HCl is claimed in a preliminary German patent. Entire plant consists of a single tower lined with graphite-based, corrosion resistant material. Hydrogen and chlorine are burned in a bell-shaped reaction chamber at bottom of tower. Acid, in form of gas, passes through slits in chamber and travels up through an absorbent, non-corroding packing. *U.S.I. Chemical News* reports water or dilute acid drips down cooling tower walls and reaction chamber, while being simultaneously concentrated.

Adhesive used on oldest ship

A waterproof resorcinol glue made and donated by Borden Chemical Company is being used to restore world's oldest ship still afloat, the U. S. Constellation.

For more information on product at right, specify 4325 see information request blank opposite last page.

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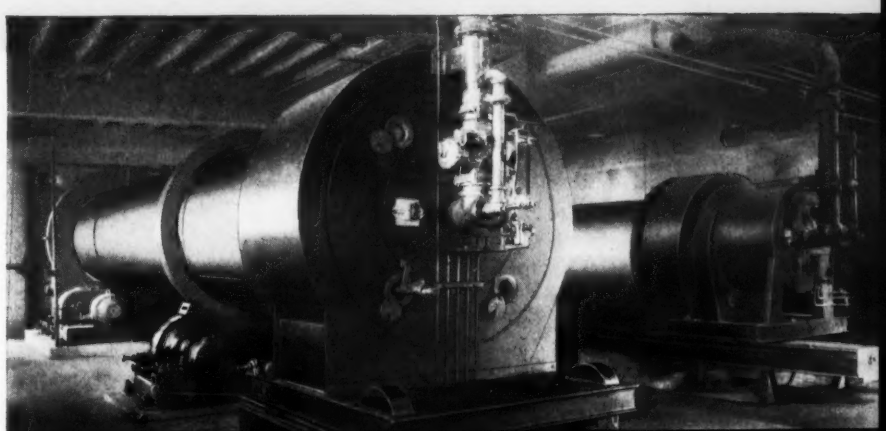
CONTINUOUS AND BATCH *Kilns*

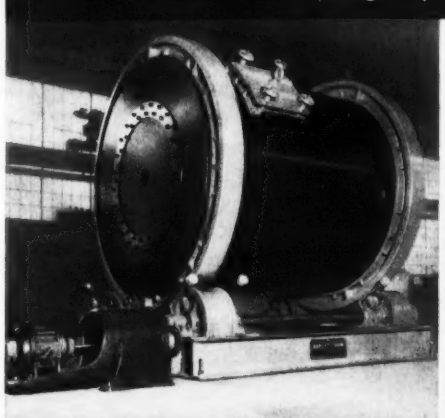
for processing various materials, pre-heating, etc.

The continuous kilns are ideally suited for calcining ores, petroleum coke, and crystalline chemical salts, nodulizing ores, applying ceramic coatings to granulated materials and performing a variety of other oxidizing and mildly reducing operations. Temperatures to 2900° F. The batch kilns, flame heated through a port in one end of the cylinder, are widely used for pre-heating charges for electric furnaces, and other heating, drying and pre-heating services. Temperatures to 1900° F. Our complete laboratory facilities are available to help you improve old, or develop new techniques and processes. Let us work with you on your next project!

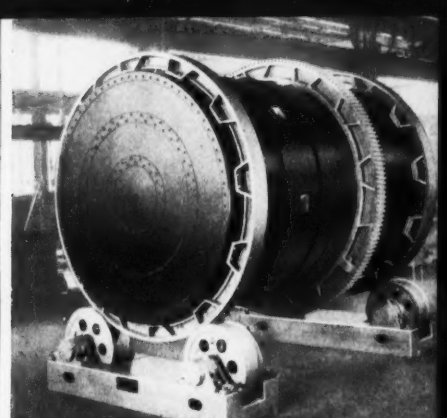
Bulletin No. 118 gives full details. Send for a copy today.



Two of Three Oil-Fired Kilns in a Mid-Western Manufacturing Plant, Working Temperatures 2300° F.



Standard Batch Kiln Complete Except for the Fuel-Burning Equipment.



Special Batch Rotary Kiln for Pre-Heating Charges for Electric Furnaces. Process and Equipment Patented.

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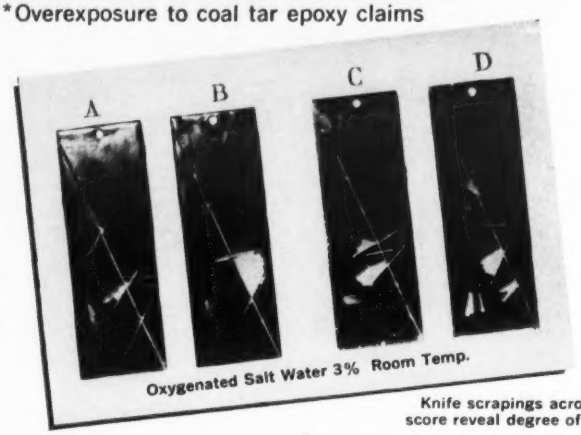
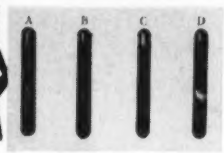
SUFFERING FROM COALTAREPOXICATION?*

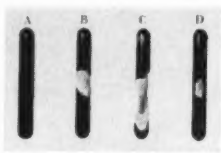
*Overexposure to coal tar epoxy claims



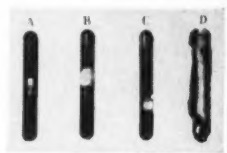
Knife scrapings across diagonal score reveal degree of undercutting.



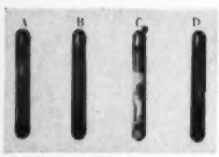
Caustic Soda 5% Room Temp.



Sulfuric Acid 10% Room Temp.

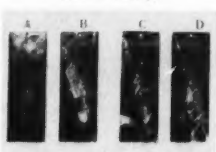


Sulfuric Acid 30% Room Temp.

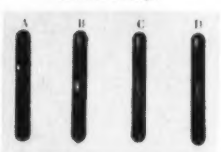


Sodium Hypochlorite 5% Room Temp.

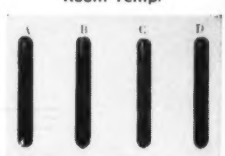
Aviation Gas 100/130 Octane Room Temp.



Salt Spray (scored panels) Room Temp.

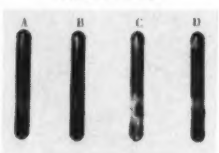


Distilled Water 140°F



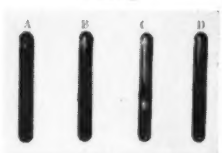
Distilled Water Boiling

Sodium Chloride 20% Boiling



Sour Crude 120°F

JP-4 Jet Fuel 120°F



Aromatic petroleum hydrocarbon solvent—120°F

Try these tests to end the confusion

116

So many conflicting claims have been made about virtually every coal tar epoxy coating on the market that prospective users are finding it difficult to fish out the facts from a sea of superlatives.

Perhaps you can find *your* answer by duplicating any or all of these laboratory tests comparing the four leading coal tar epoxies.

THE TESTS: The rods and panels illustrated here were carefully coated to the four manufacturers' specifications and then subjected for three months to the corrosive agents indicated above. The wide range of tests included varying concentrations of chemicals, ambient and elevated temperatures, weathering and all usual types of exposure.

THE RESULTS: Some results were predictable, such as the failure of all four coatings to withstand aromatic petroleum hydrocarbon solvent. But striking differences occurred in such tests as oxygenated salt water, when only Coating A (Amercoat No. 78) resisted undercutting. Products B, C and D were all blistered and undercut to varying degrees. In none of the remaining tests was Amercoat No. 78 excelled, and in most cases it showed marked superiority.

CONFIRMATION: The properties attributed to No. 78 in these tests have been substantiated repeatedly in actual field use. Applicators like it because it (1) gives dependable, all-around protection, (2) sprays more easily than competitive products, (3) builds thick films without difficulty because of its higher solids content, and (4) dries thoroughly but at a moderate rate, avoiding the extremes of prolonged tackiness and fast-dried brittleness.

Because of the unusual importance of these tests to prospective users of coal tar epoxy coatings, we have prepared illustrated copies of the complete report. Write for yours today!

(Amercoat No. 78 was formerly designated No. 1686)

Amercoat CORPORATION

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4809 Firestone Boulevard
South Gate, California

921 Pitner Ave. Evanston, Ill
360 Carnegie Ave. Kenilworth, N.J
2404 Dennis St. Jacksonville, Fla.
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Check 4326 opposite last page.

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